THE

FARMER'S TOUR

THROUGH THE

EAST of ENGLAND.

BEING

The Regiſter of a Journey through various Counties
of this Kingdom, to enquire into the State
of AGRICULTURE, &c.

CONTAINING,

- I. The particular Methods of cultivating the Soil.
- II. The Conduct of live Stock, and the modern Syſtem of Breeding.
- III. The State of Population, the Poor, Labour, Proviſions, &c.
- IV. The Rental and Value of the Soil, and its Diviſion into Farms, with various Circumſtances attending their Size and State.
- V. The Minutes of above five hundred original Experiments, communicated by ſeveral of the Nobility, Gentry, &c.

WITH

Other Subjects that tend to explain the preſent State of
ENGLISH HUSBANDRY.

By the Author of the FARMER'S LETTERS, and the
TOURS through the North and South of England.

VOL. II.

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THE
FARMER's TOUR
THROUGH
ENGLAND.

AT *Maſſingham*, north of *Runcton*, have been practiſed many of the moſt conſiderable improvements that have been known in *Norfolk*. This country, before the great works done by incloſing and marling, was all a wild ſheep-walk; but through the uncommon ſpirit of many great farmers, has been advanced in value to an amazing degree.

The marle has been laid on in the proportion of 70 loads an acre, which has generally laſted 25 years; after that, many farmers have tried 30 loads more, but without ſucceſs.

Mr. *Carr* of this place, who has had long experience in the marle huſbandry, recommends laying on no more than 35 or 40 loads; and then as much more in three or four years, by which means it will far better incorporate with the ſoil. But the beſt way of uſing it after the firſt moderate marling, is to form compoſts of it with dung; ſo mixed, it works better in the ſoil. Mr. *Carr* thinks the beſt criterion of marle is to try it in water; if it is good, it will fall at once and diſſolve, and make the water white; but as to the effervеſcence with acids, he has found the bad ſorts have that quality more than the good, which is very uncommon.—He is further of opinion, that marle ſhould be laid on in autumn, that the weather may ſhatter it.

Oil-cake, as a manure, is uſed by many farmers. Mr. *Carr*, in compliance with the general opinion, tried it in a large extent—he laid out 140 *l.* in oil-cake for one crop, but received very little benefit from it. On another occaſion he fattened ſome bullocks on oil-cake, and the dung he raiſed from them, was twice as beneficial as the cakes themſelves ſpread on the land: excellent manure!

Folding is here greatly depended on: they practiſe it throughout the year except juſt at lambing time. Mr. *Carr*, from an attentive obſervation, prefers the winter folding much to that of ſummer: this muſt be owing to the ſun exhaling the virtue of dung in the latter ſeaſon.

Six hundred ſheep will fold 40 acres in the year.

The ſoil here is a light ſandy loam; and lets in general at 8 *s.* an acre. The courſe of crops is,

1. Turnips, fed on the land.
2. Barley or oats.
3. Clover one year, without ray-graſs.
4. Wheat.

The barley yields on an average 4 or 4½ quarters *per* acre, and wheat from 2½ quarters to 5: the average about 3. Turnips are worth, one year with another, 27 *s.* an acre: 400 fat ſheep, Mr. *Carr* calculates, will eat a good acre every day; but this ſeems a very large allowance. They give an acre at a time, and always pull them up with cromes or hooks a day before the ſheep are let in: they do not pen the ſheep, but move on the hurdles, taking in an acre at a time, and uſing but one row. They are fed off ſometimes with bullocks, but it is a bad way; for they find that one acre drawn and carried off, will go as far as three on the land. Their ſtock ſheep they put to turnips three weeks before lambing time.

At the firſt improvement, it was common to take two crops of turnips running, for cleaning the land, and it anſwered very greatly: the barley ſown after the two crops was much better than any ever known in the common courſe. Mr. *Carr* has had 6 ½ quarters *per* acre in that manner.

They mow the firſt crop of clover for hay, get 1 ½ load an acre, and feed the ſecond; and they get better wheat after this management than after feeding through the whole year. If the clover is ſown as above for mowing, they uſe but 10 *lb.* of ſeed an acre: but on that land deſigned for ſheep, they ſow a buſhel of ray-graſs with it. A ſack of ray-graſs ſhould weigh 8 or 9 ſtone.

The profit of ſtock ſheep is reckoned;

Lamb, - - -	0	7	6
Wool, - - -	0	1	0
	0	8	6

And to ſhew from the inſtance of ſheep, the amazing improvement of this country; it is a fact, that as many ſheep are now kept as before the incloſure, while the whole country was ſheep-walk. Mr. *Carr* keeps 500 ſtock ſheep, beſides 340 fat ones; and there were but 600 before, of ſo inferior a quality that his 500 are much ſuperior in product. Upon Mrs. *Pigg*'s farm only 1700 were kept while all was walk; and her preſent flock amounts to that number of much better ſheep.——If theſe inſtances are not deciſive in favour of incloſing open lands, and do not prove the abſurdity of the aſſertions that arable improvements hurt our woollen manufactures, and therein prejudice the general intereſts of the ſtate——Nothing can, nor is there a plain fact in the whole circle of domeſtic politics.

Land ſells at 28 years purchaſe. Some tythes are gathered, but in general they are compounded for in the great. Poor rates, 1 *s.* 3 *d.* in the pound.

In their tillage they uſe but two horſes in a plough, all wheel ones; and do two acres on an average in a day. The price 2 *s.* 6 *d.* an acre.

Mr. *Carr* has tried the cultivation of ſpring wheat; he finds it to turn out as well as any other crops he has had. The grain is equal to the beſt in the country, fine ſoft corn, not hard or ſteely: his crop was 3 quarters *per* acre. The particulars of Mr. *Carr*'s farm are as follow:

1000	Acres in all	30	Horſes
100	Wheat	2	Cows
200	Barley	20	Fatting beaſts
40	Oats	500	Stock ſheep
200	Turnips	300	Fatting ditto in winter
250	Clover		
60	Peaſe, &c.	40	Ditto in ſummer.
150	Various		

Being in the neighbourhood of *Weaſenham*, where Mr. *Billing* lives, the farmer who received ſeveral premiums from the *London* ſociety for the culture of carrots, I determined to requeſt a ſight of the fields in which he raiſed them; and alſo to enquire into the truth of the report I had heard, that he had for ſome years totally done with carrots. I viewed the land, and tried the depth of it with a ſtrong ſtick; it is a ſandy loam, moſt excellent turnip-land; it was cropped with that root, and a finer appearance never was ſeen; I could not thruſt the ſtick with all my force deeper than 6 inches, which ſurprized me. Mr. *Billing* informed me that he ploughed no deeper for the carrots than for common crops, but yet he had many roots 16 inches long, and 15 or 16 inches in circumference. He left off the culture after the crop of which he publiſhed the account: this the world will doubtleſs think very extraordinary; for nothing could be clearer or more deciſive than the advantages there ſet forth: the profit evidently beat that of turnips by many degrees. I aſked him the reaſon of his not continuing the culture: he ſaid, They did not anſwer. I deſired to know why. He replied, that the expences were ſo heavy that they could not do. Turnips are gained much eaſier, and at a much lighter expence.—This I found his general opinion. I enquired more minutely into a compariſon of the two roots; but Mr. *Billing* anſwered me only in generals.

This is a very critical circumſtance in the hiſtory of carrots. The enemies of the culture cry out, *See how finely this new huſbandry turns out, that has been ſo praiſed! The only man that ever extended it over a large ſpace of ground has given it up. Does not this ſufficiently condemn it?* This is the way in which many hereabouts, and doubtleſs elſewhere, will reaſon. To enter into a criticiſm on any man's conduct while it is merely private, would be impertinent; but the general intereſt of half the kingdom is concerned in the preſent caſe: I ſhall therefore offer a few remarks to ſhew, that Mr. *Billing*'s conduct ought by no means to prevent the carrot culture from becoming common.

He condemned carrots in general, but it was only from general ideas: he praiſed turnips in a rational manner; I plough ſo often, at ſuch an expence, hoe them for ſo much, and they pay me ſuch a ſum, at the ſame time that they clean the land; therefore I adhere to turnips. This was deciſive; but now for carrots,—The medal was reverſed; he knew nothing of the matter; he had no idea of the expence; conſequently it was magnified: he talked of 20*s.* an acre; then of 30*s.* and at laſt of 50*s.* and 3*l.* When I aſked him the value of an acre; *he could not tell.* What ſheep will it maintain? *He could not ſay.* What beaſts will it fat? *He did not know.* What *profit* will an acre pay in the groſs? *He was not certain.* And, after another query or two—*He knew nothing at all of the matter.*

The reader will naturally aſk, *how can this be with a man who wrote ſo clear an account of carrots?* In anſwer to which I would recommend to the ſociety, to give their premiums to people who not only really perform the experiments required, but alſo give their own accounts of them; if a man cannot write, he ſhould dictate—but the perſon who writes down his account ought not to ſupply any thing but the mere pen. There is a general turn in Mr. *Billing*'s pamphlet in favour of carrots, that ſpeaks as ſtrongly as the experiments themſelves: all which is directly contrary to his opinion. To ſome of my queſtions he told me there was a book publiſhed about carrots; in the ſame breath that he mentioned circumſtances quite contrary to any in the pamphlet.

I take the real caſe to be this; he was adviſed to try carrots, but againſt his own opinion; and finding them better than he expected at firſt, repeated the trials for ſome time. When he came to enlarge the culture to whole fields, the attention they required in hoeing and the expence being much ſuperior to turnips, gave him a diſguſt:—the largeneſs of his buſineſs made more compendious crops agreeable—his men went regularly to work with turnips almoſt without directions; nor would he ſpare a ſufficiency of hands from the other crops to do juſtice to the carrots: and theſe circumſtances, I have little doubt, were the reaſon of his leaving off the practice. But as to drawing up an account of all the expences, with every diſadvantage of the crop, and then ſtriking a balance to diſcover its real merit—he never did it, and I will venture to pronounce he could not do it; for he took not minutes ſufficient for the purpoſe—and thoſe which he did take he has now forgotten. Let us for a moment examine his account of his crop, in 1763, of 30½ acres, and calculate, as well as his *data* will allow, the expences and profit.

EXPENCES.

Ploughing 13½ acres thrice, at 2*s.* 6*d.* - -	£. 5	1	3
Ditto 17 acres twice -	4	5	0
Dunging 3 acres, ſuppoſe we allow 12 load an acre, at 2*s.* 6*d.*	4	10	0
Seed, 30½ acres, at 4*lb.* an acre	8	2	0
Sowing, ſuppoſe 6*d.* an acre.	0	15	3
Carry over,	22	13	6

Brought over,	£.22	13	6
Harrowing, ſuppoſe –	0	15	0
Firſt hand-hoeing, at 11 *s.*	16	16	6
Harrowing – –	0	7	6
Second hand-hoeing, at 4 *s.* 6 *d.*	6	17	3
Harrowing – – –	0	7	6
Taking up, ſuppoſe 10 *s.* an acre	5	5	0
Rent, at 14 *s.* – –	21	7	0
Total expence,	84	9	3

Or 2 *l.* 16 *s.* 3 *d.* *per* acre.

The produce in the account is calculated various ways; firſt it is by loads: the crop was 510 cart loads of carrots, equal to 300 loads of hay in the conſumption.

300 Loads of hay, at 40 *s.*	600	0	0
Expences – –	84	9	3
Clear profit –	515	10	9

Or *per* acre 17 *l.* 5 *s.*

300 Loads of hay, at 35 *s.*	525	0	0
Expences – – –	84	9	3
Clear profit –	440	10	9

Or *per* acre 14 *l.* 13 *s.* 7 *d.*

300 Loads of hay, at 30*s.*	£.450	0	0
Expences - -	84	9	3
Clear profit -	365	10	9

Or *per* acre 12*l.* 3*s.*

I have given theſe various prices for the uſe of different places, where hay ſells at different rates.

The calculation of the produce is by the ſtock maintained.

By fattening 12 neat beaſts; 49 ſhearing wethers; 5 cows; an heifer; and 17 *Scotch* bullocks —yielded clear profit -	£.108	0	0
Feeding a dairy of 35 cows, and a flock of 21 ſcore ſheep, three weeks, in the month of *April**	20	0	0
Carry over,	128	0	0

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* This is the calculation in the pamphlet; but the cows at 1*s.* 6*d.* and the ſheep at 3*d.* a week, come to 23*l.* 12*s.* 6*d.* And turnips, it is ſaid, were gone; I leave the reader therefore to judge whether this is adequate.

Brought over, -	£.128	0	0
Feeding 16 cart-horſes from *November* to the latter end of *May*; 2 loads of carrots in this application ſaved 1 of hay *	35	0	0
Many ſwine fed; but no account taken - -	0	0	0
Total produce, -	163	0	0
Total expence, -	84	9	3
Clear profit, -	78	10	9

Or *per* acre 2 *l.* 5 *s.* 1 *d.*

Add to this, that the barley ſown after carrots undunged in the middle of turnips dunged, was better than after the turnips—which is a prodigious ſuperiority.

According to the loweſt of theſe accounts, the carrots pay more in CLEAR *profit* by at leaſt 15 *s.* an acre, than any turnips in this country pay in TOTAL *produce*. If this is not deciſive in their favour, I know not what can be.

In the preceding account, 10 *s.* an acre is allowed for taking up, whereas many were ploughed up: which I will venture to aſſert is a ſlovenly and loſing practice.

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* No notice is taken of the ſaving of oats, which is the plain way of calculating.

All theſe carrots, except what were given to the horſes, were fed on the ground like turnips: this is a deduction from their produce of at leaſt two-thirds: it is every where known that one acre drawn and given in ſtalls, or a warm yard, will go as far as three in the field. The objections at page 15 of the pamphlet, are trivial, and ſuppoſe bad management in the method diſapproved. Beaſts in a warm yard well littered with ſtubble, and ſheds around it, do not founder: nor need the ſtale be loſt; and as to the beef not being ſo good, it is an abſurdity.

After theſe accounts drawn from Mr. *Billing*'s pamphlet, what are we to ſay to his leaving off the culture, under the idea of *its not anſwering*? Is it not very evident, that he has declined the moſt profitable crop that ever his farm produced? This is the effect of farmers not keeping accounts: they talk of experience; but written experience in theſe caſes alone deſerves the name. Mr. *Billing*'s general notions (which are what farmers call experience) are diametrically contrary to the practice which he found excellent, and recommended as ſuch to the public. He is not peculiar in this, for the profit of crops to which they are not heartily inclined, will never have their experience an advocate.

About *Sandringham*, the ſeat of *Henry Corniſh Henley*, Eſq. are very conſiderable tracts of ſandy land, which are applied at preſent only to the feeding rabbits: it is a very barren ſoil, but not I apprehend incapable of cultivation; it lets from 1 *s.* 6 *d.* to 2 *s.* 6 *d.* an acre in warrens: Mr. *Henley* has tried ſome experiments on it lately, with a view to diſcover how far it will anſwer cultivating. The value of it is prodigiouſly advanced by planting; that gentleman has formed ſeveral plantations, which thrive extremely: all the firs do well; and will pay a better rent for the land than any huſbandry.

Much of the country improves in ſoil about *Snettiſham*. The better ſort of lands there are generally thrown into what is properly called the *Norfolk* huſbandry.

Farms riſe from 20 *l.* to 370 *l.* a year; but are in general from 70 *l.* to 90 *l.* The ſoil is either ſand or ſandy loam, on a chalky marle. The rent from 10 *s.* to 14 *s.* an acre: but the poor warren ſands towards *Lynn* from 1 *s.* to 2 *s.* 6 *d.* an acre. The courſe moſt common is,

1. Turnips
2. Barley
3. Clover and ray-graſs, ſometimes one year: but by the beſt farmers 2 years
4. Wheat.

For wheat they plough but once, ſow 3 buſhels, and gain on an average 3 quarters. Rye they ſubſtitute on ſome lands inſtead of wheat, ſow 3 buſhels, and get 3 ½ quarters. For barley they plough 3 times, ſow 2 ½ or 3 buſhels, and get 3 quarters. For oats they plough but once, ſow 4 buſhels an acre, and get on a medium 4 quarters. For peaſe they give but one earth; and reckon the average crop at 2 quarters.

Coleſeed they cultivate both for feeding ſheep and alſo for ſeed. They eat it off time enough to ſow wheat; but the value of the food is not much. They feed thoſe crops they intend for ſeed, but do miſchief by it; the crops vary from 3 ½ to 10 quarters. They always ſow wheat after it.

They plough four times for turnips, and hand-hoe twice. They draw ſome for fatting beaſts, but in general eat it off with ſheep. The average value 35 *s.* an acre.

Clover they often mow twice for hay the firſt year; but always feed it the ſecond.

A few tares are ſown to ſoil horſes within the ſtable, green; but it is not common.

Some buck-wheat is ſown, which they feed on the land with various cattle, and ſow wheat after it. A little hemp is beginning to be cultivated on ſpots of ſtrong land; but not much.

They fold all their ſheep, in winter as well as ſummer. Salt has been tried as a manure by a few farmers, who have bought whole ſhip-loads. It coſts 3 *l.* 5 *s.* a ton; and 10 *s.* more in expences, and a ton does for 3 acres. It was tried on a good loamy ſoil for wheat, this year, and the crop promiſes ſo greatly, that the farmer has bought a conſiderable quantity more.

Oil cake is likewiſe much uſed; they break it to pieces not larger than walnuts by mills; one ton, at 3 *l.* 10 *s.* to 4 *l.* 10 *s.* does three acres. It is attended with very great benefit, but it laſts only one crop.

Lime they have tried, burnt from chalk: it does good; but is not comparable to marle. It does not laſt.

Marle is their grand manure; they lay 80 loads an acre; it is a fine fat ſort, white, and laſts from 14 to 20 years. They do not chop their ſtubbles; but their hay they ſtack at home.

The beſt graſs lets at 20*s.* an acre: They uſe it for fattening ſheep; an acre will carry 5 or 6 fat wethers.

A cow will, in the beſt part of the ſeaſon, give 7 or 8 *lb* of butter a week: and the quantity of milk 3 or 4 gallons a day. The annual produce about 5*l.* 5*s.* a year. They underſtand very well the uſe of a dairy in keeping ſwine: they have much larger ſtocks on account of their cows.—A dairy-maid can take care of 20. They keep them in winter in the yard, and give them many turnips. There are large tracts of freſh water marſhes: they buy beaſts for them in the ſpring, and after the ſummer feeding give them turnips: they buy lean at from 7*l.* to 12*l.*; and ſell at nearly double thoſe prices. An ox-hide is worth from 15*s.* to 20*s.*: it is now of double the value it was 25 years ago.

Breeding flocks riſe to 7 or 800. The profit is,

Lamb, - -	£.0	7	0
Wool, - - -	0	1	0
	0	8	0

The wether flocks they manage in the following manner; about *Lammas* they buy in wether lambs 6 or 7 months old: and keep them lean on ſtubbles, and offal turnips, giving them the leavings of the old ſtock of fat wethers; after which they are well kept through the ſummer on graſſes, and folded all the time. Soon after *Michaelmas*; they are put to turnips; and are ſold fat from *Candlemas* to *May-day*, and ſome even to *Midſummer*: they give them ray-graſs and clover in the ſpring as ſoon as turnips are done. This conduct of ſheep is reckoned much the moſt profitable method of managing them. They ſtock their graſſes with 4 to an acre; and reckon that ſpace of turnips will keep 10 from *Michaelmas* to *Candlemas*.

In their tillage, they reckon 16 horſes neceſſary to 500 acres of arable land. They uſe 2 in a plough; do two acres a day; and in ſeed times 3, but it is with 4 horſes; 2 in the morning, and 2 in the afternoon. One man looks after 4 or 5 horſes, and every day ploughs 2 or 3 acres with 4 of them. They plough about 5 inches deep; and the price is 2*s*. 6*d*. an acre. The annual expence of a horſe they calculate at 5 *l.*; feed them much with ſtraw cut into chaff. They begin to break their ſtubbles for a fallow ſoon after winter corn ſowing. Wheel ploughs only are uſed; they find that they can do more a day with them than with ſwing ones, and at the ſame time much truer.

The hire of a cart, 4 horſes, and a driver *per* day, 10 *s.*

In the ſtocking farms, they reckon 3000 *l.* neceſſary for one of 500 *l.* a year; with which ſum ſome marling may be done.

Tythes are generally compounded; they reckon 4 *s.* in the pound a fair compoſition. Poor rates 1 *s.* in the pound: 20 years ago they were but 6 *d*; and 30 years ago only 4 *d.*

LABOUR.

For the harveſt of 5 weeks, 45 *s.* to 50 *s* and board.
In hay-time, 1 *s.* 6 *d.* to 2 *s.* and beer.
In winter, 1 *s.* 2 *d.*
Reaping, 5 *s.*
Mowing barley, 1 *s.*
———— graſs, 1 *s.* to 2 *s.*

Hoeing turnips, 4 *s.* and 2 *s.*

Hedging and ditching, 1 *s.* a rood of 7 yards.

Filling and ſpreading marle, 25 *s.* the 120 loads, of about 30 buſhels. In general 5 or 6 horſes and 2 carts with one driver will carry 40 loads a day; the expence 12 *s.* the 40 loads, beſides the 8 *s.* 4 *d.* filling, &c.

Thraſhing wheat, 1 *s.* 2 *d.* to 1 *s.* 4 *d.* *per* quarter.

——— barley and oats, 8 *d.* ditto.

——— peaſe, 1 *s.* 3 *d.*

Head-man's wages, 10 *l.* to 12 *l.*

Next ditto, 9 *l.*

Lad's, 4 *l.* to 7 *l.*

Dairy-maid's, 5 *l.*

Other ditto, 3 *l.* to 4 *l*

Women *per* day, in harveſt, 1 *s.* and board.

——— in hay-time, 9 *d.* and beer.

——— in winter, 6 *d.*

Value of a man's board, waſhing, and lodging, 10 *l.* a year.

IMPLEMENTS.

A waggon, 24 *l.*

A cart, 10 *l.*

A plough, 3 *l.*

A pair of harrows, 1 *l.*

A roller, 1 *l.* 5 *s.*
Harneſs *per* horſe, 2 *l.* 2 *s.*
Laying a ſhare and coulter, 1 *s.*
Shoeing, 1 *s.* 4 *d.*

PROVISIONS.

Bread, – –	1 ½ *d. per lb.*
Cheeſe, – –	4
Butter, – –	6
Beef, – –	3 ½
Mutton, – –	3 ½
Veal, – –	3
Pork, – –	3
Milk, – –	½ *d. per* pint.
Potatoes, – –	4 *per* peck.
Candles, – –	7
Soap, – –	6

Labourer's houſe-rent, 40 *s.*
——— firing, 10 *s.*

BUILDING.

Bricks, 20 *s.* a 1000.
Tiles, 3 *l.*
Oak timber *per* foot, 1 *s.* 6 *d.*
Aſh ditto, 1 *s.* 2 *d.*
Elm ditto, 1 *s.* 2 *d.*
Soft ditto, 6 *d.* to 8 *d.*
A carpenter a day, 1 *s.* 9 *d.*
A maſon and thatcher, ditto.

The particulars of a farm are as follow.

300 Acres in all
£. 150 Rent
60 Acres Wheat
60 Turnips
60 Barley
60 Clover 1 year old
60 Ditto 2 years old

14 Horſes
10 Cows
10 Young cattle
10 Fatting beaſts
100 Sheep
3 Men
1 Boy
4 Labourers.

Nicholas Styleman, Eſq; of this place has effected a very important improvement by banking out the ſea: which undertaking was by many thought very daring and hazardous. In 1750, he began to form a bank a mile long, and it was completed in a year. By means of ſubſtituting ſingle horſe carts with 9 inch wheels, inſtead of barrows, he made an immenſe ſaving in the labour of the work. A ſquare of 7 yards, by 12 inches deep, was dug and thrown into the carts for 1 *s.* and only boys drove them. By this means he was enabled to be ſo uncommonly expeditious. The marſhes were before let for only 4 *s.* an acre; but they were directly advanced to 20 *s.* In this manner 300 acres were at once improved, at the ſmall expence of 1500*l.* The advance of rent 240*l.* a year; which from the above capital is a profit of 16 *per cent.* An inſtance of ſucceſsful ſpirit which does great honour to Mr *Styleman.*

This gentleman has been very active in the incloſure of ſome commons in the pariſh of *Snettiſham.* There were 41 houſes that had a right of commonage over all the open fields after harveſt, which totally prevented the uſe of turnips and clover. This great inconvenience induced Mr. *Styleman* to give his conſent to and promote an act for incloſing the commons and preventing ſo great an incumbrance on the huſbandry of the open fields.

But in executing this idea he planned the outline of it in ſo candid and charitable a manner, that he kept as ſtrict an eye to the intereſt of the poor people, as to his own. In lieu of rights of commonage, the proprietors of a pariſh incloſed, generally divide it amongſt themſelves, and give the poor no indemnity: But Mr. *Styleman* determined at firſt that they ſhould have ſomething valuable in exchange for their right. He allotted each of the 41 old common right houſes 3 acres contiguous to their dwellings, or their other property. 600 acres of old graſs common were left ſo for theſe poor to turn their cattle on in a ſtinted manner. It maintains 205 cows, 120 mares and foals till 10 months old; 80 yearling calves, and 80 fillies. In their little incloſures they grow turnips, barley, wheat, and a little hemp.

The poor of the whole pariſh in general uſed to cut whins for firing over the whole extent of open fields: inſtead of this practice, which was the deſtruction of much land, he aſſigned them 100 acres of common in one incloſure for cutting turf: each houſe under 40*s.* a year rent has a right to cut 3000 flag (turf) a quantity ſufficient for the winter's firing.

This ſyſtem has been perfectly well adapted to the deſign propoſed of attending minutely to the intereſt of the poor. Their little incloſures are of great uſe in maintaining their cows on a pinch in winter, on turnips or clover-hay; and their tillage is executed by their brood-mares. And it is obſervable, that no inſtance has been known of any inhabitant of theſe 41 cottages ever being chargeable to the pariſh. The poor rates are from 9*d.* to 1 *s.* in the pound; before the incloſure they were 1 *s.* 6 *d.* This fall has been owing to the increaſe of employment ariſing from the incloſure and its conſequences; and to the poor having been ſo much favoured in the act.

At the ſame time that ſuch uncommon attention has been given to the poor; it has not deſtroyed, through a falſe idea, the riſe of the landlord's income, generally expected on ſuch occaſions. The rents of the pariſh are in general raiſed a third by the incloſure: one farm belonging to the corporation of *Lynn*, is raiſed from 160*l.* to 360*l.* a year.

While theſe general good effects have taken place, an increaſe of inhabitants has been ſenſibly obſerved—for the great increaſe of employment, with the ſuperior benefits attending a reſidence here to what are elſewhere found, has tempted various people to ſettle in the pariſh. The number of ſouls before the incloſure was 500; it is conjectured that they are now 600.

The comfort of living in this pariſh induces many to come and reſide in it: if 20 new cottages were built, they would be immediately filled: and Mr. *Styleman* is not clear, that was ſuch an addition made, whether the rates would riſe.

He farther informed me, that there is never any want of hands in this country to execute any the greateſt works; had he miles of banking to do, the procuring hands for the execution would never be the leaſt difficult.

There is a tract of country (it is ſcarcely to be called *land)* in this place belonging to Mr. *Styleman*, which is not of any value at preſent, not producing 2 *d.* an acre: it is the ſhore from which the ſea has withdrawn, and conſiſts of nothing but ſhingle; that is, ſtones of various ſizes, but none larger than a man's fiſt, of a great depth, and with a ſmall mixture of ſand among them. Here and there it yields a poor ſtinted appearance of ſomething like graſs—but bears a ſprinkling of the eringo plant in tolerable luxuriance: it would be impoſſible regularly to cultivate ſuch a ſoil; but I apprehend it would yield ſuſtenance ſufficient for ſeveral trees of the pine ſort—ſuch as firs, &c. &c. The experiment richly deſerves the trial; for any plantation would turn out wonderfully profitable on ſuch an abſolute waſte as this Mr. *Styleman* has 1500 acres of it.

On other ſoils this gentleman has formed large plantations; he has above 100 acres of thriving ones. He finds from particular obſervation on their growth, that *Scotch* firs planted at 2 years old are worth 1 *s.* 6 *d.* on an average in 14 years.

Rent of an acre of land 14 years, at 10 *s.* - - -	£. 7	0	0
Town charges, &c. -	1	0	0
Raiſing, fencing, planting, &c.	3	0	0
Expence *per* acre,	11	0	0

Suppoſing the thinnings to pay the incidental expences; 5000 planted *per* acre at firſt, and thinned to 2000.

2000 trees, at 1 *s.* 6 *d.* cut down at the end of 14 years -	150	0	0
Expences - - -	11	0	0
Clear profit,	139	0	0
Upon 10 acres, this is	£ 1390	0	0
Upon 50 ditto, -	6950	0	0
Upon 100 ditto,	13900	0	0

What amazing profit is this to reap in 14 years! I have ſuppoſed them all cut down at the end of the 14 years, to ſhew the certain profit of a ſpecies of farming never yet thought of, which is that of hiring land on a leaſe of 14 years, under the covenant of liberty not only to plant, but alſo to cut down again:—What huſbandry will equal this? Suppoſe the number of trees but a fourth of the above, ſtill no common crops under great expences will equal this with none at all.

In my way from *Snettiſham* northwards, I paſſed by *Sommerfield* and *Sunderland*, the two famous farms occupied by Mr. *Curtis*, and belonging to Mrs. *Henley* of *Docking*. I was miſtaken upon another occaſion in ſaying, that they conſiſted of 2500 acres: I was now informed that they amounted to no more than 1700. This farmer's ſheep huſbandry is nearly executed on the plan above-mentioned of buying and ſelling wethers; he generally fats 1000 every year on turnips, giving ſome the ſpring graſs. So good a farmer's purſuing this conduct, gives one reaſon to think it the moſt profitable method.

The ſoils are gravelly loams, and what they call here white corky land; which is a chalk ſoil without the qualities of marle. Lets at 8*s.* or 9*s.* an acre.

Rents on an average the whole way from *Snettiſham* about 10*s.*—From hence to *Holt* 14*s.* Their courſes are,

1. Fallow
2. Wheat
3. Barley
4. Turnips
5. Barley
6. Clover, for 2 years
7. Wheat.

And,

1. Fallow
2. Wheat
3. Barley
4. Peaſe
5. Turnips
6. Barley
7. Clover
8. Wheat.

Alſo,

1. Turnips
2. Barley
3. Clover
4. Barley.

Likewiſe,

1. Turnips
2. Barley
3. Clover
4. Wheat.

Theſe are all good, except the crops of wheat and barley coming together, which is quite contrary to the principles of the beſt *Norfolk* huſbandry.

For wheat, if not on clover, they plough four times; ſow 3 or 3½ buſhels of ſeed, and

The country is all under the beſt *Norfolk* culture from hence to *Wells*. About *Burnham*, land lets at 10*s.* 6*d.* an acre in large farms: the particulars of one are as follow.

1000 Acres in all	200 Turnips
£. 500 Rent	300 Clover
400 Corn	700 Sheep.

From *Burnham* to *Wells* I obſerved the crops in general better than any I had ſeen ſince I entered *Norfolk*. Rents are 14*s.* an acre on an average. The produce of wheat from 4 to 5 quarters *per* acre. Of barley the ſame.

Turnips worth 50*s.* an acre.

Clover they leave two years on the land, but mix a peck of ray-graſs with it. They value clay more than marle; lay 80 loads an acre, which laſts good 14 years; after which they add a little more.

Oil-cake they alſo uſe; they lay about half a ton *per* acre.

About *Warnham*, the ſeat of Sir *John Turner*, Bart. the huſbandry is equal to any of the foregoing, with ſome variations that render it ſuperior.

Farms riſe from 200*l.* to 500*l.* a year.

The ſoils are gravelly loams, and what they call here white corky land; which is a chalk ſoil without the qualities of marle. Lets at 8*s.* or 9*s.* an acre.

Rents on an average the whole way from *Snettiſham* about 10*s.*—From hence to *Holt* 14*s.* Their courſes are,

1. Fallow
2. Wheat
3. Barley
4. Turnips
5. Barley
6. Clover, for 2 years
7. Wheat.

And,

1. Fallow
2. Wheat
3. Barley
4. Peaſe
5. Turnips
6. Barley
7. Clover
8. Wheat.

Alſo,

1. Turnips
2. Barley
3. Clover
4. Barley.

Likewiſe,

1. Turnips
2. Barley
3. Clover
4. Wheat.

Theſe are all good, except the crops of wheat and barley coming together, which is quite contrary to the principles of the beſt *Norfolk* huſbandry.

For wheat, if not on clover, they plough four times; ſow 3 or 3½ buſhels of ſeed, and gain 3 quarters in return. They ſtir for barley three or four times, ſow 3 buſhels, and reckon the average produce 4 ½ quarters. They do not cultivate any oats; but buy thoſe they want for their own uſe. For peaſe they plough thrice, ſow 3 buſhels, and get on a medium 2 ½ quarters.

Their tillage for turnips conſiſts of four earths: they always hoe twice; and feed them off with beaſts and ſheep: they fat beaſts of 50 ſtone upon turnips in this manner; they give them a little hay in the field, but never fatten, in the yard, or in ſtalls. They are very attentive to follow a fat ſtock with a lean one.—Lean beaſts or ſheep come after the ſtock of fat beaſts.

They often find the barley better after beaſts than after ſheep alone: this I ſhould ſuppoſe could be owing to nothing but the ſoil wanting heavier treading than ſheep give it.—The average price of turnips 30 *s.* an acre.

They mow the firſt growth of the firſt year's clover; but afterwards only feed it.

Some tares are ſown, but they are chiefly uſed for ſoiling horſes in the ſtable.

In their manuring they are attentive to keep their land in great heart. The ſheep-fold is uſed all winter through, except juſt at lambing time; it is applied either for wheat or turnips.

Marling has been practiſed here theſe many years; they lay 60 loads an acre, at the expence of near 30*s*. It laſts 15 or 16 years in perfection; they then lay 25 or 30 loads more, which laſt 10 or 12 years longer; and after that they will again repeat it; being convinced from experience, that the benefit of theſe repetitions is very great, contrary to the idea in ſome parts, where it is imagined that after the firſt marling it will not anſwer.

Another excellent practice, which perpetuates marling, is the forming compoſts of that and dung, which mixed manure they find anſwers better than either ſeparately. If they would uſe 10 loads an acre of dung alone, they will not ſubſtitute more than 12 of this compoſt, and find it more beneficial. In one circumſtance, however, they are ſtrangely deficient; they form the heap in layers; but all the mixing it gets is in loading, for they never turn the heaps over.

Oil-cake they uſe for wheat: a ton and three quarters will do for 3 acres; the price from 3*l.* 3*s.* to 4*l.* a ton. They bring it both from *Ireland* and *Holland*, but they find the *Dutch* cakes beſt, from their not preſſing them ſo much. It laſts ſtrong only for one crop; but is a help to the following turnips.

They buy large quantities of dung at *Wells*, for which they pay 1 *s.* a cart-load. Much of the dung which now brings crops of 8 quarters an acre in the incloſures round the town, Sir *John Turner* remembers being thrown into the haven; no man thought it worth the carriage.

Malt combs they ſow on their barley lands; the price 3 *d.* a buſhel.

One practice of which they are very tenacious, I cannot but condemn. They never chop their ſtubbles, accounting them as good ploughed into the ground as a light coat of dung. I ſhould not declare againſt a maxim proved experimentally; but that is not the caſe here, they never chop—but are conducted by a general idea.

Good turnips are ſometimes gained after wheat ſay they, without dung; to what can that be owing but to the ſtubble? I reply, the ſame thing is found in twenty places where the ſtubble is carried clean off. It may be owing to the oil-cake, or to twenty other reaſons, not explained by them. But they find their ſoil ſo looſe, that beaſts feeding off turnips are preferable to ſheep—how does this accord with leaving the land in ſo hollow and puffing a ſtate as wheat ſtubble ploughed in, muſt do? The ſtubble is no *manure*: it is too dry and ſpread too thinly to enrich the ſoil: common ſenſe muſt ſpeak this. But now to the only material compariſon: cut the ſtubble of half a field, cart it home, form it into a ſtack without the farm-yard, and where it ſhall not be enriched by any of that dung which is preſerved there, but let the drain, which carries off the urine from all the buildings, and the waſh from the yard, be filled with it from day to day, ſo as to abſorb the whole; as faſt as it is taken out, form it into a freſh heap mixed with ſome earth, or marle; after the winter, turn the heap over twice, and leave it till quite rotten: then cart it to a part of that half of the field from whence it was taken. Keep an exact account; charge every expence of cutting, carting, re-carting, mixing, &c. &c and then ſee which ſide of the field pays you beſt in clear profit. This caſe is not exactly neceſſary, for if the ſtubble heap is formed by rain alone into a maſs of *rotten* ſubſtance, the ſuperiority of the method will ſtill be great. But I propoſe a way of ſaving that, which in all the farm-yards in *Norfolk*, and I may ſay the kingdom, runs to waſte.

With good management the ſame ſyſtem ſhould be carried on within the yard—the litter ſhould be increaſed by all the ſtubble; and the heap of dung receive all the urine either by a pump or water-bowl.

The breed of cattle here is all the little mongrel, *Norfolk* ſort; but excellent for the dairy: a good cow will give 12 to 15 *lb.* of butter a week; they give 5 gallons of milk a day, ſome will give ſeven. Moſt of the dairies are let—the cow hirers give 3 *l.* 3 *s.* a year, and 3 *l.* 10 *s.* for which the farmer keeps up the ſtock, and finds all food and fuel. This is being paid little more than 1 *s.* 3 *d.* a week, beſides the chance of loſſes:—it is aſtoniſhing how any perſon can think ſuch a ſum an adequate value for a cow.

Many ſwine are here kept on account of cows ; a dairy of ten will maintain 20 hogs, but in ſummer all are kept on clover. A dairy-maid will take care of twelve. The winter food is turnips alone ; no hay, except a little at calving.

Their ſyſtem of fatting beaſts is to buy in in *November* ; they chooſe thoſe that are forward in fleſh ; put them directly to turnips, and ſell fat from clover and ray-graſs in *June*. Buy at about 7 *l.* and ſell from 11 *l.* to 12 *l.*

The hide of a *Scotch* beaſt of 30 ſtone, is worth 15 *s.*

Swine generally fat to 16 or 18 ſtone.

Flocks of ſheep from 500 to 700 : the profit the lamb and wool ; which they reckon,

Lamb - - -	0	9	0
Wool - - -	0	1	3
Total profit, - -	0	10	3

The winter food is turnips alone ; no hay, unleſs the ſnow is ſo deep that they cannot get at the crop.

In their tillage they reckon 12 horſes neceſſary to 200 acres of arable land. They uſe 2 in a plough ; do 2 acres or 2 ½ a day, at 2 journeys with 4 horſes. Stir 4 inches deep: the price *per* acre 2*s.* 6*d.* The annual expence of a horſe they calculate at 6*l.* 6*s.* The ſummer joiſt 2*s.* a week. They cut much ſtraw into chaff.

They do not break up their ſtubbles for a fallow till *February* or *March.* Uſe only wheel ploughs; have tried ſwing ones, but find the former much lighter to the horſes.

In the ſtocking farms, they reckon 2000*l.* neceſſary for one of 550 acres, the rent 300*l.* a year; and they divide that ſum in the following manner:

30 Horſes,	£. 360	0	0
20 Cows,	120	0	0
15 Beaſts,	105	0	0
500 Sheep,	270	0	0
Swine,	10	0	0
3 Waggons,	60	0	0
4 Carts,	56	0	0
5 Ploughs,	10	0	0
5 Pair harrows,	7	0	0
2 Rollers,	2	0	0
Harneſs,	60	0	0
Sundries,	40	0	0
Furniture,	100	0	0
Rent,	150	0	0
Carry over,	1356	0	0

Brought over,	£.1356	0	0
Town charges,	25	0	0
Tythe,	50	0	0
Houſekeeping,	120	0	0
4 Men,	29	0	0
2 Boys,	7	0	0
3 Maids,	11	0	0
2 Labourers,	35	0	0
Extra labour,	50	0	0
Seed, 60 acres wheat,	45	0	0
—— 130 Barley,	52	0	0
—— 130 Clover,	30	0	0
—— 80 Turnips,	3	0	0
Caſh in hand,	200	0	0
Total,	2013	0	0

Land ſells at 27 or 28 years purchaſe.

Tythe 2 *s.* an acre in general.

Poor rates 8 *d.* in the pound: 20 years ago they were but 4 *d.* The employment ſpinning; all drink tea twice a day; and many a third time for dinner.

All the farmers have leaſes.

LABOUR.

In harveſt, 2 *l.* 2 *s.* or 2 *l.* 5 *s.* and board for the harveſt.

In hay-time, 1 *s.* 6 *d.* a day and beer

In winter, 1 *s.* and beer.

Mowing graſs, 1 *s.* 6 *d.* and beer.

Hoeing turnips, 4 *s.* and 2 *s.*

Filling marle cart, 25 *s. per* 120, fill and ſpread.

Thraſhing wheat, 1 *s.* 6 *d.* to 1 *s.* 8 *d. per* quarter.

———— barley and oats, 10 *d. per* quarter.

———— peaſe, 11 *d.* ditto.

Head-man's wages, 10 *l.*

Next ditto, 8 *l.*

Next ditto, 5 *l.* to 6 *l.*

Lad's, 3 *l.* 10 *s.*

Maid's, 3 *l.* to 3 *l.* 10 *s.*

Value of a man's board, waſhing and lodging, 10 *l.*

The riſe of labour, a fifth in three months of the year; and an eighth during the other nine.

PROVISIONS.

Bread, - -	1 ½ *d. per lb*
Cheeſe, - -	3
Butter, - -	6
Beef, - -	3 ½
Mutton, - -	3 ½
Veal, - -	3

Pork,

Pork,	3 ½	
Bacon,	7	
Milk,	½ *d.*	*per* pint.
Potatoes,	3	*per* peck.
Candles and ſoap,	7	*per lb.*

Labourer's houſe-rent, 33 *s.*

———— firing, 20 *s.*

———— wear of tools, 10 *s.*

BUILDING.

Bricks, 1 *l. per* 1000.

Oak timber *per* foot, 1 *s.* 6 *d.*

Aſh ditto, 1 *s.* 2 *d.*

Elm ditto, 1 *s.*

Soft woods, 9 *d.*

A carpenter and maſon a day, 1 *s.* 8 *d.* and beer.

A thatcher, 1 *s.* 8 *d.* and beer, or 1 *s.* a ſquare yard.

The particulars of a farm.

500 Acres in all
£.260 Rent
30 Horſes
20 Cows
12 Beaſts
500 Sheep
60 Acres wheat
130 Spring corn
130 Clover
60 Turnips
4 Men
2 Boys
2 Labourers.

Sir *John Turner* has for ſeveral years

given much attention to huſbandry; he has in ſome inſtances improved on the management of his neighbours, good as that is—and in others, introduced practices unknown here before.

Experiment, No. 1.

As the lord of the manor of *Wells*, he enjoyed a large tract of ſea coaſt, and had a conſiderable ſpace of low land cut by a creek and flooded every tide, which he thought would make good marſh-land if ſecured from the ſea by a bank. He immediately executed it: and the ſucceſs has anſwered his utmoſt wiſhes: the bank was made at the expence of 650*l.*; and 130 acres gained by it, which let at 25*s.* an acre.

As ſoon as the firſt work was done, he ſtopt all the ſprings, and little water-courſes from the higher grounds, by large and deep drains on the edge of the marſh; and then cut a great carrier drain 10 feet wide, along the middle of it; into which ſmaller drains were cut; and all the water let into the ſea by a ſluice in the bank, the doors opening to let out the freſh water, and ſhutting by the ſuperior weight of the tides.

A very fortunate circumſtance in this drainage is the ſurprizing plenty of freſh water: the ſea was no ſooner ſhut out, than the old creek was at once full of very fine freſh water, and has ſince been a winding freſh water of 4 acres: Such plenty of good water is of vaſt conſequence in grazing lands.

As ſoon as the drains were made, the next buſineſs was to level the old creek, which ran very irregular, and in many places formed miſhapen ſwamps and holes; all theſe were filled up: then the ſurface was pared and burnt an inch deep, and the land ſowed with coleſeed: the produce half a laſt an acre; ſold at 18*l.* a laſt. After the coleſeed a crop of oats was taken of 3 quarters an acre, and then another of 4 quarters. After which it was ſummer fallowed; then oats again; the crop 4 ½ quarters an acre, and with them all ſorts of graſs ſeeds were ſown, particularly white clover, red clover, trefoile, hay ſeeds, ray-graſs, &c. In ſome places, all failed except the ray-graſs: but white clover came amongſt that the following year.

The graſs has been extremely good ever

ſince, as may eaſily be ſuppoſed from much of it being let at 25 *s.* an acre; though the rent before the banking was only 6 *d.* One acre fats an ox of 50 ſtone, and a wether, ſufficiently to put them to turnips; or would fatten 5 large *Lincolnſhire* ſheep. The graſs is ſo ſweet, that it will completely fatten beaſts of 40 or 50 ſtone in 7 months. —Much of it has fattened 2 beaſts of 40 ſtone, *per* acre.

After the drainage, Sir *John* aſſigned a piece of ten acres for the poor of the pariſh, which maintains a very great number of ſtock: nothing was done to this piece, and yet it is extreme good and rich graſs; from which hint he determines, in caſe of a future undertaking of this ſort, not to pare or plough it at all; only to level the ſmall holes, and make the cuts for draining; which would render the improvement much leſs complex.

Sir *John Turner* has another tract of marſhes of 1800 acres, let at preſent at only 4*d.* an acre; it is capable of being ſecured from the ſea: The bank for that purpoſe ſhould be 100 feet baſe, regularly ſloped to 6 feet at the top; the height of it in the centre 10 feet. The expence of ſuch a bank 3 miles long would be 5148 *l.*; the intereſt of which ſum, at 5 *per cent.* amounts to 257 *l.*; and the product of the improvement the two firſt years, at

10 *s.* an acre,	£.900
The third year,	1350
The fourth,	1800
And afterwards.	2250

a year. The undertaking upon the whole, would be uncommonly profitable; far more advantageous than any other expenditure of ſuch a ſum in any part of the kingdom.

In forming a bank, the price of the work is 2 *s.* 6 *d.* to 4 *s.* a floor of 400 cubical feet, for filling and barrowing the earth a ſingle run; which is ſuch a length, that men who run the barrows need not be relieved: planks to run on, to be found them; but they find their own barrows.

Experiment, No. 2.

Sainfoine, Sir *John Turner* has cultivated with great ſucceſs. He has ſeveral pieces of it, which have anſwered better than the common huſbandry on the ſame ſoil would have done. The ſoil is a light turnip loam on chalk. The firſt year the produce was very inconſiderable: The ſecond, it was a pretty good crop: from that time to the preſent (18 years ago) it has produced at an average 1 ½ load an acre, worth 4*l.* on a moderate computation: and the after-graſs 15*s.* an acre. For 7 years in the height of the crop, it yielded 2 loads an acre. Let us calculate the common huſbandry according to the particulars given above.

Expences.

Firſt; Turnips.

4 Earths and harrowings, –	£. 0	12	0			
Manuring, –	1	10	0			
Seed and ſowing, –	0	0	9			
Hoeing, – –	0	6	0			
Rent, &c. –	0	12	0			
				3	0	9

Second; Barley.

3 Earths and harrowing, – –	0	9	0			
Seed and ſowing,	0	8	0			
Mowing and harveſting,	0	6	0			
Thraſhing, –	0	3	9			
Carrying out, –	0	4	6			
Rent, – –	0	12	0			
				2	3	3
Carry over,				5	4	0

Brought over, –				£.5	4	0
Third; *Clover*, &c. two years.						
Seed and ſowing,	£.0	6	0			
Mowing, carting, and ſtacking, –	0	6	0			
				0	12	0
Fourth; *Wheat*.						
1 Earth, –	0	3	0			
Seed and ſowing,	0	16	0			
Manuring, –	1	5	0			
Reaping and harveſting,	0	7	6			
Thraſhing, –	0	5	0			
Carrying, –	0	3	0			
Rent, – –	0	12	0			
				3	11	6
Total, – –				9	7	6
Produce.						
Turnips, – – –				1	10	0
Barley, 4 ½ quarters, –				4	1	0
Clover, firſt year, –				3	0	0
——— ſecond, – –				1	5	0
Wheat, 3 quarters, –				6	0	0
Total produce, –				15	16	0
Total expences, –				9	7	6
Profit in 5 years, –				6	8	6
Or *per* acre *per annum*,				1	5	8

SAINFOINE.

Expences.

Mowing, making, carting and ſtacking,	£.0	7	6
Rent,	0	12	0
	0	19	6

Produce.

1 ½ Load hay,	4	0	0
After-graſs,	0	15	0
Total produce,	4	15	0
Total expences,	0	19	6
Profit,	3	15	6
Ditto by common huſbandry,	1	5	8
Superiority,	2	9	10

I have formed this calculation as an anſwer to thoſe who inſiſt that money is loſt by this experiment. I have on both ſides taken the particulars from the ſame authority— and from a perſon (Sir *John*'s ſteward) who ſeemed to be of opinion, that the tillage courſe was moſt profitable. It is evident from hence, that ſainfoine is the moſt advantageous. It would appear yet more ſo if the intereſt of the firſt ſtock was on both ſides carried to account: Indeed the rents on poor ſoils, that are in many parts of the kingdom paid for this graſs, are twice over what the *Norfolk* farmers pay for their beſt land; which ſhould give one ſome idea of its real value. The ſuperiority of the ſainfoine is ſo great, that it will admit the expenditure of 20*s.* *per* acre *per annum* in ſoot or aſhes;—without any correſponding increaſe of crop, and yet remain much more beneficial than the other.

Experiment, No. 3.

Lucerne he has cultivated with as much ſucceſs as ſainfoine. The ſoil on which it is ſown is a good turnip land; ſuch as lets here at 7*s.* 6*d.* an acre. There is an acre and half of it; half ſown three years, and half four years ago: it was on a turnip fallow in the ſpring without corn: the weeds did not riſe much, as the land was clean; and thoſe that came were cut down with the lucerne at the firſt mowing before they ſeeded. After which the growth of the crop was always quicker than that of the graſs, conſequently they were deſtroyed by the ſcythe.

Every ſpring it is harrowed until it carries the appearance of a fine fallow. It has been regularly cut every five weeks; and is found, from an accurate obſervation, to grow from 22 to 26 inches every 28 days. Every ſpring it is manured after the harrowing, at the rate of 6 loads an acre of rotten dung.

As to the produce, it is very great: Six coach, and ſix other horſes are chiefly fed with it through the ſummer; but if horſes were to be confined ſolely to it, it would maintain at the rate of five *per* acre from the middle of *April* to *Michaelmas*, at 2 *s.* *per* horſe *per* week. Laſt year's five cuttings, had they been made into hay, would have amounted to 6 tons *per* acre; which cannot be calculated at leſs than 12 *l.* 12 *s.*

One part of the crop, for a trial, was ſet out with hand-hoes in the ſame manner as turnips: I remarked that part of the piece to be about 2 inches higher growth than the reſt, and was ſomething of a deeper green.

Sir *John Turner* has, upon the whole,

found it ſo extremely profitable, that he recommends it to every one; and has endeavoured, though in vain, to perſuade his tenants to try it.

That the profit is very great, will appear from ſtating the expences and produce.

Rent, &c. &c. - -	£ 0	10	0
Harrowing, - - -	0	2	6
Cutting five times, -	0	7	0
Raking together, loading and carting home, -	0	15	0
	1	14	6

Produce.

Keeping 5 horſes 26 weeks, at 2 *s.*	13	0	0
Expences, - -	1	14	6
Clear profit, -	11	5	6
The common huſbandry of this country was found to pay *per* acre profit, - -	1	5	8
Superiority of the lucerne,	9	19	10

Sir *John*'s common huſbandry is very perfect; and remarkably adapted for keeping his land as clean as a garden. The ſoil of his farm is of two ſorts, one a very light loam naturally poor, and is unprofitable if not very attentively managed. When he took it into his own hands he found it in miſerable order; the courſe of crops he followed to bring it into good heart, is,

1. Turnips
2. Barley
3. Clover 12 *lb.* and half a peck of ray-graſs an acre, left on the land 2 years.

And then turnips again. So that only one crop of corn is taken in four years. The firſt growth of the clover is mown; and then fed for a year and half. Was a crop of wheat to be taken on the clover in the farmer's method, it would be a very poor one; and that of barley be as 6 to 10 at preſent.

Upon his better ſoil he takes,

1. Turnips
2. Barley
3. Clover
4. Wheat.

And a proof of the goodneſs of the former, is the crops of turnips, barley and clover on the poor ſoil, being equal to thoſe in this courſe on the rich one.

His turnips are worth 1 *l.* 15 *s.* on an average. The barley produces 5 quarters an acre; he has ſometimes on weak land had 6 quarters. The clover gives a load and half of hay at one mowing: and the wheat 3 quarters *per* acre.

His farm is a very well diſtributed one. It in general is,

236	Acres in all
24	Acres Turnips
24	Barley
24	Clover for mowing
24	Ditto fed
16	Sainfoine
1 ½	Lucerne
24	Meadow
16	Rich marſh
15	Paſture
50	Plantation
14	Water.

Experiment, No. 4.

Oſiers he tried for an experiment in his marſh land: three roods were planted, and let without difficulty for five guineas a year.—So vaſt a rent has determined him to apply more land to ſo profitable an uſe.

Experiment, No. 5.

In the preparation of a piece of very ſtiff, clung, marſh land for wheat, foreſeeing that a great many ploughings would be neceſſary to reduce it, he determined to ſow it with buck-wheat, with intention to plough it in in time for ſowing the wheat.

It was accordingly done; and it anſwered greatly in mellowing this harſh ſoil—much more than ſeveral extra ploughings would have done.

Experiment, No. 6.

The neighbourhood of the ſea in this country, ſuggeſted to this gentleman the thought of a manure which had totally eſcaped the farmers: it was that of ſea ouze. Some of his tenants occupied a conſiderable tract of arable land that joins to the marſhes by the ſhore; he directed one of them to ouze a ſmall field at the rate of 50 loads an acre, in the ſame manner as if it was marle, and to ſow it with turnips. No effect appeared in that crop; but in the barley which followed, the richneſs of the manure ſhewed itſelf ſtrongly; it yielded four loads and an half an acre in the ſtraw; the crop 6 or 7 quarters. The clover was uncommonly fine, and the wheat which followed the ſame—and the land ever ſince has diſplayed in the cleareſt manner, the vaſt fertility it has gained by this manure.

A proof no ways equivocal, is the practice of the tenant; for on ſeeing the firſt crop of barley he immediately went to work again, and ouzed a larger field; and ſince that has been as regularly at it, as any one can be at marling: he has thus manured a large ſpace of land, and continues the improvement. I rode over ſeveral of his fields thus managed, let at only 4*s.* an acre, and others at 6 or 8, which were covered with as fine crops of turnips, clover, and barley, as can be ſeen in *Norfolk*; he has no barley on ouzed land that will yield leſs than 5 or 6 quarters an acre; and he gets 3 quarters an acre of wheat on 4*s.* land.—There are marle pits in theſe fields, but the farmer prefers the ouze.

Experiment, No. 7.

Sir *John Turner* has not only planted many acres as an addition to the beauty of his ſituation, but has alſo attended to the growth of the trees, for diſcovering the profit of planting on his ſoils. In one plantation, *Scotch* firs, at 12 years growth, are worth 1 *s.* each.

Experiment, No. 8.

In a plantation of 50 years growth, the land 8 *s.* an acre, the trees are various, and the value as follows.

Oak, worth 10 *s.* each.
Aſh, 12 *s.* 6 *d.* ditto.
Elm, 10 *s.* ditto.
Scotch fir, 7 *s.* 6 *d.* ditto.
Lime, 5 *s.* ditto.

Suppoſe the number of each equal, the average value is 9 *s.* The number about 5000 on an acre.

500 trees, at 9 *s.* are 225 *l.* or 4 *l.* 10 *s.* *per* acre *per annum*, from the firſt planting; but the thinnings have produced very conſiderable ſums: and the graſs under the trees would now let at 5 *s.* an acre.

Experiment, No. 9.

In another plantation of 50 years growth, on land of 8 *s.* an acre, the trees, 250 *per* acre, are worth—

The oak, 16 *s.* each.
Aſh, 10 *s.* ditto.
Lime, 9 *s.* ditto.
Scotch fir, 16 *s.* ditto.

Average, 12 *s.* 9 *d.*

250 at that price, come to 154 *l.* 7 *s.* 6 *d.* *per* acre *per annum*, beſides the thinnings: this is above 3 *l.* *per* acre *per annum* from the firſt planting.

Had all been oak or fir the total would have been 200 *l.* *per* acre, or 4 *l.* *per* acre *per annum* from the firſt planting.

Experiment, No. 10.

In another plantation, elms of 40 years growth (300 on an acre) are worth 22 *s.* each: this is 330 *l.* *per* acre; or more than 8 *l.* *per* acre *per annum*; and the land now would let as well as before the planting.

Experiment, No. 11.

A plantation of *Scotch* firs of 15 years growth, 300 on an acre, are worth 1 *s.* 6 *d.* each. This is 22 *l.* 10 *s.* an acre, or 1 *l.* 10 *s.* *per* acre *per annum*, beſides thinnings.

The great profit of planting is obvious from theſe trials; but the whole ſtate of the caſe by no means appears here; for the product of the thinnings is conſiderable. Sir *John* calculates, that he never receives leſs than a guinea an acre in thinnings throughout his plantations; which is eaſily to be conceived, as they are at firſt planted only 4 feet aſunder.—The loweſt profit here mentioned, is 1 *l.* 10 *s.* an acre; add 1 *l.* 1 *s.* for thinnings, it is 2 *l.* 11 *s.* *per* acre; deduct 11 *s.* rent and expences, there remains 40 *s.* an acre clear profit, which is more than the farmers make by all their trouble, induſtry and hazard.

I cannot but add to theſe trials in huſbandry and planting, that Sir *John Turner* has proved himſelf to be not only a true friend to his country, in proſecuting theſe undertakings with ſpirit, but has alſo ſhewn himſelf a ſuperior farmer in the midſt of a country cultivated better than moſt in *England* *

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* The ſituation of *Warham* is the moſt beautiful in *Norfolk*, and as much worth viewing as half the houſes to which travellers are ſo eager to run. The houſe ſtands on the brow of a gently riſing hill, backed to the north with very fine plantations of 50 years growth. They have ſomewhat the appearance of a creſcent form, ſheltering from the north, eaſt, and weſt, and opening to the ſouth, down over a beautiful winding vale, and then commanding a rich varied proſpect of diſtant encloſures. Some villages and churches, ſcattered about the view, and a large, tho' regular, water in the valley, all tend to make it chearful. While the thick woods which crown the tops of ſeveral hills, and the groves that ſink into the vale, throw a pictureſque beauty over the ſcene that cannot fail to ſtrike the ſpectator.

The view that breaks at once upon you on coming through the dark fir wood in the approach from *London*, is very beautiful. You look at once upon a range of lofty plantations around the houſe, whoſe dark ſhade forms a

From *Warham* I took the coaſt road to *Sherringham*, making that the way to *Holt*. The crops, I obſerved, were not ſo good as about *Warham*, tho' much of the country is very well cultivated. I paſſed through *Stukey*,

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contraſt to the brilliancy of the landſkip that ſets it off in the fineſt colours.—In front, you look upon various clumps, riſing boldly from the water, united in ſome places with thick hedges, and in others broken by incloſures, that ſpreading over the hill to the left, the water is loſt under a dark grove: the fields riſe ſo thick above it, as to unite with a diſtant plantation which crowns the hill; a church is happily ſituated on the point of it; and beyond is ſeen a more diſtant rich wood-land. Full to the left, is a large *Daniſh* camp of three entrenchments, which are quite perfect *. Turning to the right, you look upon an incloſure which breaks into the plantations; it is fringed with open wood that half obſcures the village, ſcattered thickly with trees; and *Warham* ſteeples, one peeping over the thick plantation near the houſe, and the other more open, complete the view.

As you advance through the vale in the way to the houſe, the ſcenes change, but all are beautiful The varied lawns, and hanging ſlopes, crowned in ſome places with woods, and in others broken by rich incloſures, are all truly pictureſque and beautiful.

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* An encampment of *Sweno* the *Dane*. One of the meadows is called *Sweno*'s mead.

Stukey *, and near to *Blakeney*, about *Sherringham*, land lets at 15 *s.* an acre. Their courſe,

1. Turnips
2. Barley
3. Clover
4. Wheat.

The turnips are generally as fine as any; the barley produces 3 ½ quarters *per* acre

on

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* The ride from *Warham* by *Stukey*, is thro a much more pictureſque country than is commonly met with in *Norfolk*; the road runs on the brow of the hill looking down on *Stukey* vale, and commanding, for ſome diſtance, a very complete landſcape. The vale, which is compoſed of meadows of the fineſt verdure, winds in a very beautiful manner from out a thicket of woody incloſures, and retires, at the other, behind a projecting hill: an humble ſtream glides through it, and adds a chearfulneſs, which water can alone confer. The hills riſe in a bold manner: they are bare of wood; but that is compenſated by the thick incloſures in which the village is ſcattered; forming with its church in a dip of the hill, and that of *Blakeney* above it, in a prouder ſituation, a moſt complete and pleaſing picture.

Between *Stukey* and *Cley* is the little village of *Cockthorp*, which contains but three houſes, and yet has furniſhed *Britain* with three famous admirals; Sir *Cloudſley Shovel*, Sir *John Narborough*, and Sir *Chriſtopher Mims*.

Near *Blakeney* is another uncommon view, quite

different

on an average; their clover is bad; not often more than a load of hay an acre: wheat 3, or 3 ½ quarters.

From *Sherringham* to *Holt*, is acroſs a

flat

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different from that at *Stukey*: the road winds into a ſequeſtered valley ſhut out from the ſea, by a bold, uncultivated hill. To the right, the grounds ſhelve from the road into a narrow vale. In this little woody hollow, is a village half ſeen among ſtraggling trees: the ſteeple is uncommonly pictureſque; half of it is hid by a riſing ſlope, and the church three fourths obſcured by a thicket of trees. The oppoſite hill riſes very boldly; it preſents a large incloſure, under the thick ſhade of a noble ſpreading wood; which hangs to the right into another valley, but is loſt behind a regular bare hill of a conic form; which riſes from the junction of the vales, in a very remarkable manner; and almoſt ſcreens a diſtant range of riſing incloſures. Immediately to the right, is a ſloping tract of fields, and above them wild ground, with a white tower riſing from behind it. The whole forms one of thoſe half gloomy, and yet not unpleaſing ſcenes, in which *Pouſſin* delighted; it is a ſpot worthy of ſuch a pencil.

Sherringham Cliff is a very high ſteep ſhore; it looks on one ſide full upon the ſea, and on the other over a various country abounding with inequalities of ground: many hills ſcattered wildly about, numerous cultivated incloſures, and ſix or ſeven villages are ſeen. *Sherringham* is prettily overlooked, backed by a riſing hill.

flat diſagreeable country: nine tenths of it a black ling heath, or a whin cover; but all greatly capable of cultivation.

About *Melton*[*], land lets at 14 *s.* an acre on a medium; barley yields 4 quarters; wheat, 3½; turnips very fine; but the clover, like that at *Sherringham*, is but middling. Large dairies are kept about here; they feed the cows in the paſtures and meadows, but are wretched managers (like the generality of the *Norfolk* farmers) of their graſs lands; they are all over-run with ruſhes and other rubbiſh; very wet, but no drains made.

From *Holt* towards[†] *Aylſham*, the country is in general rich and well cultivated;

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[*] Sir EDWARD ASHLEY, at this place, has a large park which has lately been ornamented judiciouſly; and a water made with uncommon difficulty; which, when properly united with wood, will have a good effect. From a windmill near the park is a prodigious view of a rich woodland country, finely intermixed with cornfields, and wanting nothing but a river to be complete.

[†] At WOLTERTON Lord *Walpole* has a ſeat well environed with wood. The *Hall*, 30 by 27.—A *Dining-room*, 30 by 27. A good picture of

but improves as you advance. In the neighbourhood of the latter place for ſome miles around, particularly towards the coaſt, the huſbandry is very good.

Farms are rather ſmall; in general from 50 *l.* a year to 100 and 150 *l.* The ſoil a mixed one; gravelly, and ſandy loams; excellent for turnips; lets from 7 *s.* 6 *d.* to 20 *s.*; average about 14 *s.* The whole way to

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of King *Charles.*—A *Dreſſing-room*, 21 by 18, hung with tapeſtry of lively and ſpirited colours.—A *Bed-chamber*, 25 by 22, the tapeſtry here alſo is very fine; the chimney-piece handſome. The *Saloon*, 36 by 30; the tapeſtry, ſophas, and chairs, repreſent *Æſop*'s fables, done in a natural, and pleaſing manner. The windows look on ſome very fine woods.—A *Drawing-room*, 25 by 21, the tapeſtry fine.—A *Bed-chamber*, 22 by 21.—A *Dreſſing-room*, 21 by 18. The pier glaſſes throughout the houſe are large and very handſome.

Adjoining to *Wolterton* park is *Blickling*, the ſeat of the Earl of *Buckinghamſhire*; the park is large, and the water (in the form of a great winding river) one of the fineſt in the kingdom: It is near a mile long, and in general from 2 to 4 or 500 yards over; the colour is very bright. But what renders it uncommonly beautiful, is the noble accompanyment of wood. The hills riſe from the edge in a various manner: in ſome places to *Norwich*, it runs at about 12 *s.* Their courſes of huſbandry have variations.

1. Turnips
2. Barley
3. Clover
4. Wheat
5. Barley.

This laſt crop of barley is bad.—Another courſe they have, is to leave it out, and take turnips again.

1. Turnips

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places they are ſteep and bold; in others they hang in waving lawns; and ſo crowned and ſpread with wood, that the whole ſcene is environed with a dark ſhade, finely contraſting the brightneſs of the water.—Some woods of majeſtic oaks and beech, dip in the very water; while others gently retire from it, and only ſhade the diſtant hills. Sometimes they open in large breaks, and let in the view of others darker than themſelves, or riſe ſo boldly from the water's edge, as to exclude every other view.—About the center of the water, on the right of it, is a projecting hill, thickly covered with beech: their ſtems are free from leaves, but their heads unite and form ſo deep a gloom, that not a ray of the ſun can find admittance, while it illumines the water, on which you look both ways. This partial view of the lake (for the branches of the beech hang over the water, and form an horizon for the ſcene) is ſtrikingly beautiful. You will dwell on it with uncommon pleaſure.

The houſe is unfortunately ſituated cloſe upon

one

1. Turnips
2. Barley
3. Clover
4. Wheat
5. Peaſe.

Alſo,

1. Turnips
2. Barley
3. Clover 2 years
4. Barley
5. Peaſe.

This

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one end of the water; but it is a large and good one. The following are the principal rooms.

The *New-room*, 27 by 26.

The *Study*, 33 by 21. Here is a very fine portrait of Sir *John Maynard*: and another of Sir *H. Hobart*, by *Lely*.

Dreſſing-room, 21 ſquare.

Bed-chamber, 27 by 21.

Dreſſing-room, 25 by 21.

Breakfaſt ditto, 28 by 22. Here is a good copy of a portrait of Sir *James Hobart*.

On the principal floor, firſt,

An *Anti-room*, 25 by 24.

Drawing-room, 45 by 24. Here are the King and Queen, by *Ramſay*, both well done. Portrait of Sir *John Maynard*; a good one. And another of Lord Chief Juſtice *Hobard*, in which both the face and hands are fine.

Dreſſing-room, 25 by 22.

Bed-chamber, 25 by 16. Ditto, 27 by 22.

Library, 120 by 22, and 22 high. The book-caſe arranged on both ſides. It is an excellent collection; and an admirable rendezvous room.

This is a good courſe for many ſoils. Another they find extremely beneficial, is,

1. Turnips
2. Barley
3. Clover 2 years
4. Buckwheat
5. Wheat.

They plough once for wheat, ſow 2 ½ buſhels if they get it into the land early, but 3 buſhels if later; 3 quarters or 3 ½ are the average produce; but 5 quarters are often gained. For barley they plough three or four times; ſow 4 buſhels, and get 4 quarters in return; ſeldom more than 5. They give the ſame tillage for oats as for barley, which is an uncommon inſtance of good huſbandry; ſow 4 ½ or 5 buſhels, and get 5 ½ or 6 quarters on an average. For peaſe they ſtir but once, ſow 4 buſhels; never hoe, but get 3 ½ quarters an acre.

They give four or five earths for turnips, hand-hoe twice; and feed off with cattle and ſheep: if the crop is large, they have a method of expending them, which I believe is peculiar to themſelves. They firſt feed one piece, ſuppoſe an acre, by unning a row of hurdles acroſs the field: hen, before they move the hurdles, they draw another acre, and cart them on to the acre eaten off for the cattle; and ſo on throughout the field: always carting the crop from the land where it grows to the part cleared. Their motive for putting themſelves to this expence, is to make the turnips go ſo much the further, and at the ſame time preſerve the benefit of the cattle to the barley crop: if the produce is large, and cattle are turned in, they ſpoil as much as they eat; but when the turnips are laid clear above the ſoil, and the earth partly ſhaken off, they eat them up clean.—The price *per* acre, to draw and cart them in this manner, is from 50*s.* to 3*l.*

Of clover they mow the firſt crop, and feed the ſecond: the crop of hay generally 2 loads an acre, ſometimes 3. They ſow 10*lb.* of clover, and a peck of ray-graſs, which they here call by its proper name Darnel; but if for their lambs in ſpring, they ſow a peck of the latter.

No tares cultivated.

For buck-wheat they plough three or four times, ſow 5 pecks to an acre; the average crop 4 quarters, ſometimes 6. It is as good as oats for horſes; ſells generally 2*s.* a quarter under the price of barley

— but its being an ameliorating crop like peaſe, the inferiority of price is abundantly made up. They always ſow wheat after it; and on cold ſpringy land ſometimes plough it in for that crop. by uſing a buſh faggot before the ploughs to level it: and this management anſwers prodigiouſly for two crops; better than dung. They never ſow buck-wheat till the beginning of *June*: and they reckon that is more beneficial to the land than any other crop. Wheat very ſeldom fails of great crops after it.

In their manuring they are pretty attentive. They fold all the year through, for wheat or turnips. Marle they depend much on; the ſort they uſe moſt is a grey marle, it is ſoft and ſoapy: they do not lay above 12 large loads an acre, as much as five horſes can draw, and this quantity will laſt 20 years; after which they repeat it. But then I ſhould add, as an explanation of the ſmallneſs of this quantity, that they regularly cart out their farm-yard dung on to layers of marle, mix them up together, and then ſpread them on their land; this is a regular addition to it, and they have long experienced the practice to be excellent.

lent. They harrow their ſtubbles by way of chopping them, and cart them home to the yard.

They apply their meadow and paſture lands to keeping young ſtock and cows; the former they bring into them for water, but keep them on the uplands of nights: 2 acres will carry a cow through the ſummer: A good one will give 6 gallons of milk a day: as to the product, they are generally let at 3 *l.* 10 *s.* to 4 *l.* a head.—— To 20 cows they keep from 25 to 30 ſhots; that is, ½ and ¾ grown hogs. A dairy-maid will take care of 20 cows. The winter food is ſtraw or turnips; no hay: and a calf is worth 30 *s.* in 7 or 8 weeks. They keep them in winter in the yard.

They fatten their ſwine to 28 ſtone, but the average is not above 16. They have no regular flocks of ſheep; but they fold thoſe they keep. In *Auguſt* they buy old crones, and alſo lambs of that year; likewiſe ſhearling wethers; all which ſorts they turn into their ſtubbles at *Chriſtmas*, when they put them to turnips, and after that to clover and ray-graſs. If they buy in at

10 *s.* they will ſell them fat in *April* or *May* at 18 *s.*; which, for the time, is great profit.

Sometimes they buy lean wethers, and get them fleſhy enough by *Chriſtmas* to put to turnips, and will ſell them fat from that food—ſhearling ewe lambs will clip 3 or 3 ½ *lb.* of wool.

In reſpect to the rot, they apprehend that it is owing in a great meaſure to ſpringy land in low meadows: thoſe fields in which heavy fogs are apt to hang are bad, but no land, whatever may be its quality, will rot if the ſheep are never turned on it until the ſun has exhaled all the dew. Floods they reckon not at all prejudicial.—Theſe ideas appear to me not to be ſo clear as I could wiſh.

In their tillage, they reckon 5 horſes neceſſary for 100 acres of ploughed ground; uſe 2 in a plough, and do 2 acres a day. The ploughman goes out at 6 in the morning, and does an acre by 11 o'clock; he then comes home and baits till 2, and goes out again till 7 at night; in which time he does an acre more: all this is done with a pair of horſes, beſides taking care of 5 in all: this is great work, and much exceeding what is done in moſt other countries. But they aſſert, that it can only be done with wheel ploughs; they have tried ſwing ones, but they do not equal the wheeled. They ſtir from 3 to 5 inches deep; the price 2*s.* 6*d.* an acre.—The annual expence of a horſe they reckon at 5*l.* 10*s.* They feed much with ſtraw cut into chaff.——They do not break up their ſtubbles for a fallow till after *Chriſtmas.*

In the hiring and ſtocking farms, they reckon 700*l.* neceſſary for 300 acres.

Tythes are compounded; they pay 3*s.* in the pound.

Poor rates 2*s.* in the pound; they have riſen a fourth in 20 years—The employment of the women and children ſpinning: all drink tea.

Many leaſes are granted, but not ſo many as formerly.

The farmers carry their corn from 6 to 10 miles.

LABOUR.

In harveſt, 36*s.* and board for the harveſt.

In hay-time, 1*s.* 2*d.* and beer.

In winter, 1*s.* and beer.

Reaping, 5 *s*

Mowing ſpring corn, 1 *s.* to 1 *s.* 2 *d.*

——— graſs, 1 *s.*

Hoeing turnips, 4 *s.* and 2 *s.*

Filling marle cart, 2 ½ *d.* a load; and 1 *s.* an acre ſpreading.

Thraſhing wheat, 2 *s.* a quarter.

——— barley and oats, 1 *s.*

——— peaſe, 1 *s.* 4 *d.*

Firſt man's wages, 7 *l.* 7 *s.* and 8 *l.*

Second ditto, 6 *l.* and 5 *l.* 5 *s.*

Lad's, 3 *l.*

Dairy-maid, 3 *l.* 10 *s.*

Other ditto, 2 *l.* 10 *s.* to 2 *l.* 15 *s.*

Women *per* day, in harveſt, 6 *d.* and board

——— in hay-time, ditto.

——— in winter, 6 *d.*

The riſe of labour a fourth in 20 years.

PROVISIONS.

Bread,	– –	1 ½ *d.* *per* pound.
Cheeſe,		4
Butter,	– -	6 ½
Beef,	– –	3 ½
Mutton,		3 ½
Veal,	– –	3
Pork,	– –	3 ½
Bacon,		6 ½

Labourer's houſe-rent, 40 *s.*
———— firing, from the commons.

The particulars of a farm as follow.

300 Acres in all
250 Arable
50 Graſs
£.200 Rent
42 Acres of Turnips
60 Barley
24 Wheat
84 Clover
42 Peaſe

12 Horſes
20 Cows
20 Fatting beaſts
30 Young cattle
100 Sheep
2 Men
1 Boy
2 Maids
4 Labourers.

LETTER XII.

THE city of *Norwich* is one of the moſt conſiderable in *England* after *London*; it ſtands on more ground than any other: But in number of inhabitants, ſome others aſſert an equality. By an accurate account taken a few years ago, the number reckoned by the houſes amounted to 40000; but by the bills of mortality only to 36000; the average therefore of theſe (38000) may be taken as more probable than either.

The ſtaple manufactures are crapes and camblets; beſides which they make in great abundance damaſks, ſattins, alopeens, &c. &c. &c. They work up the *Leiceſterſhire* and *Lincolnſhire* wool chiefly, which is brought here for combing and ſpinning, while the *Norfolk* wool goes to *Yorkſhire* for carding and cloths. And what is a remarkable circumſtance, not diſcovered many years, is, that the *Norfolk* ſheep yield a wool about their necks equal to the beſt from *Spain*; and is in price to the reſt as 20 to 7.

The earnings of the manufacturers are various, but in general high.

Men on an average do not exceed 5 *s.* a week; but then many women earn as much: and boys of 15 or 16 likewiſe the ſame.

Draw-boys, from 10 to 13, 2 *s.* 6 *d.* a week.
Pipe-boys and girls, from 5 to 9 years old, 9 *d.*
Combers, on an average, 7 *s.*
Dyers, 15 *s.*
Hot-preſſers, 13 *s.*
Women by doubling yarn, 2 *s.*
Ditto ſilk, 8 *s.*
Ditto by ſpinning, 2 *s.* 6 *d.* to 3 *s.*

The weaving man and his boy, who now earn in general 7 *s.* a week, could earn with eaſe 11 *s.* if induſtrious.—But it is remarkable, that thoſe men and their families who earn but 6 *s.* a week, are much happier and better off than thoſe who earn 2 *s.* or 3 *s.* extraordinary; for ſuch extra earnings are moſtly ſpent at the alehouſe, or in idleneſs, which prejudice their following work. This is preciſely the ſame effect as they have found when the prices of proviſions have been very cheap; it reſults from the ſame cauſe. And this city has been very often peſtered with mobs and inſurrections under the pretence of an high price of proviſions, merely becauſe ſuch dearneſs would not allow the men that portion of idleneſs and other indulgence which low rates throw them into.

In the management of the poor, there was once a circumſtance that deſerves noting. Previous to the year 1727, the rates throughout the city were immoderately burthened with weekly allowances to the poor, of 1 *s.* 6 *d.* 2 *s.* 2 *s.* 6 *d.* or 3 *s.* a family, in which manner 1200 *l.* a year was given. A reſolution was taken in that year to ſtrike them all off: it was accordingly done; and nothing enſued but murmuring; no ill conſequence at all.—

7 or 800 ſouls are kept in the workhouſe of this city for 7 or 8000 *l.* a year in all expences.

In reſpect to the preſent ſtate of the manufacture, it is neither briſk, nor very dull. They could execute more orders than they have; and ſome among them complain becauſe they have not ſo great a trade as during the war; for then they could not anſwer the demand, it was ſo uncommonly great (from 1743 to 1763 was their famous æra). This was however owing in ſome meaſure to many manufacturers exporting ſo largely on ſpeculation, that the markets have been overſtocked ever ſince;—and have occaſioned that falling off which has been perceived ſince.—Indeed the unfortunate difference ſubſiſting between *Great Britain* and the colonies is a great injury to them.

They now do not ſend any thing to *North America*; but much to the *Weſt-Indies*. Their foreign export is, to

Rotterdam
Oſtend
Middleburgh
All *Flanders*
Leghorn
Trieſt
Naples
Genoa
Cadiz
Liſbon
Barcelona
Hambro'
All the *Baltic* except *Sweden*, where they are prohibited.

In 70 years laſt paſt, the manufacture is increaſed as from 4 to 12.

During the laſt war, *Norwich* ſupplied

the army and navy with 4000 recruits; but her manufactures did not ſuffer in the leaſt: for they carried on more trade than ever.—The truly induſtrious do not enliſt; and as to the idle, the greateſt favour to be done to any place is to ſweep them all away.

They are in this city curious in building with flint; they cut it in regular ſquares, and form as neat joints as with the beſt bricks. The Bridewell is thus built, and ſo well executed, that it is worth a traveller's notice.

The general amount of the *Norwich* manufacture may be calculated thus.

A regular export to *Rotterdam* by ſhipping, every 6 weeks, of goods to the amount of *per annum*, - -	£. 480,000
26 tons of goods ſent by broad-wheeled waggon: weekly to *London*, at 500 *l.* a ton on an average, 13000 tons *per annum*: Value,	676,000
By occaſional ſhips and waggons to various places; calculated at, - - -	200,000
	£. 1,356,000

Upon a reconſideration of this table, it was thought that the 676,000 *l.* by waggons, was rather too high: ſuppoſe therefore only 10,000 tons, it is then 520,000 *l.*; and the total 1,200,000 *l.*

Another method taken to calculate the amount was, by adding up the total ſum ſuppoſed to be returned annually by every houſe in *Norwich*; and this method made it 1,150,000 *l.* This ſum coming ſo near the other, is a ſtrong confirmation of it.

A third method taken, was by various ways to calculate the number of looms: theſe were made 12,000; and it is a common idea in *Norwich* to ſuppoſe each with all its attendants works 100 *l. per ann.*:—this alſo makes the total 1,200,000 *l.*; which ſum, upon the whole, appears to be very near the real truth.

Reſpecting the proportion between the original material, and the labour employed upon it, they have a very ſure and eaſy method of diſcovering it. The average value of a piece of ſtuff is 50 *s.*: it weighs 6 *lb.* at 10 *d.* a *lb.* which is 5 *s.*: ſo the material is a tenth of the total manufacture.

Total, - - -	£.1,200,000
A tenth, - - -	120,000
Amount of labour -	1,080,000

In which is included the profit of the maſter manufacturer.—There is no occaſion to ſeparate that from the groſs ſum, as it is in fact *labour* as much as the manual part. All the people maintained and employed by a manufacture are the ſame in a publick view, whether they earn 10,000 *l.* a year, or but 10 *l.*

The material point remaining is to diſcover how many people are employed to earn the publick one million *per annum*; and for this calculation I have one *datum* which is to the purpoſe. They generally imagine in *Norwich*, that each loom employs 6 perſons in the whole; and as the number is 12,000, there are conſequently 72,000 people employed by this manufacture. And this is a freſh confirmation of the preceding account; for I was in general told that more hands worked out of *Norwich*, for many miles around, than in it. 1,200,000 *l.* divided by 72,000, gives 16 *l.* each for the earnings of every perſon.

This, I muſt confeſs, appears to me a very large ſum; for I have no conception of all the perſons employed earning 16*l.* a year, which is 1*s.* a day; if therefore any miſtake is in the preceding account, it muſt be in the number of looms.—The total amount of the manufacture is taken from clear facts (not ſuppoſitions) there muſt conſequently be looms ſufficient to work to that amount. 16*l.* a year may not be *much* above the truth, though probably *ſomething*; for we ſhould conſider that women and boys of 15 or 16, earn as much as moſt of the men: whereas in various other manufactures with which I am acquainted, they do not nearly equal them: and we ſhould further conſider, that we include in this 16*l.* a year, the whole profit of the maſter manufacturer.—The deviation therefore from fact, cannot be very conſiderable. For if the maſter manufacturer's profit is calculated at 14 *per cent.* and deducted accordingly, this 16*l.* a year is thereby reduced to about 11*l.* 11*s.* a year.—

It may therefore be taken as no contemptible fact, that 70 or 80 thouſand people employed in a manufacture, whatever it fine appearance. I found them a very promiſing crop: they are to be hoed again.

CABBAGES.

Four acres of a good light mixed loamy ſoil were ploughed at *Michaelmas*; again in *February*, and a third time in *March*. Upon this earth it was manured with the compoſt, 12 loads an acre, and turned in in *June*. The ſeed, 3 *lb.* was ſown in a garden the middle of *April*. The ſort, the great *Scotch* cabbage. The plants were pricked out when in 2 leaves, 6 inches ſquare. The 20th of *June* they were tranſplanted into the field in rows 3 feet aſunder, and the plants 18 inches diſtant. It was done by the ſlight mark left by the plough in ſtriking every fourth furrow; and the rows are quite ſtraight. This is a very eaſy way of planting, in ſaving the complex and troubleſome exactneſs of a line, which is otherwiſe neceſſary on flat land. The appearance of the crop is very fine, and promiſes to yield at leaſt 30 tons an acre, and the whole plantation is perfectly clean.

may be, will earn 1,000,000*l.* a year. I ſay *whatever it may be*; becauſe I conceive that the variations of earnings in the general number not to be very great.—Proviſions are pretty much on a par; and few of them more than work to live.

LETTER XIII.

THE huſbandry near *Norwich* is generally good. About *Earlham* farms riſe from 50 *l.* to 200 *l.* a year; the ſoil a loamy ſand with both marle and chalk under it. Lets from 14 *s.* to 20 *s.* an acre; average 16 *s.*

The rent from *Norwich* to *Yarmouth* is about 14 *s.*

The courſe of crops,

1. Turnips
2. Barley or oats
3. Clover, 9 or 10 *lb.* of ſeed; but if with ray-graſs, only 8 *lb.* and ½ a peck ray-graſs
4. Wheat
5. Barley.

This latter crop of barley is unworthy a *Norfolk* man. Another courſe is,

1. Turnips
2. Barley
3. Clover
4. Peaſe
5. Wheat.

They plough once for wheat, ſow 3 buſhels, and reap 2 quarters. For barley they plough thrice, ſow 3 buſhels, and reckon the average crop at 3 ½ quarters. For oats after turnips they ſtir as often as for barley, but if they ſow them after wheat only once, which is a diſtinction I do not comprehend; why the land, when it is ſo run, ſhould not be favoured as well as when clover is to be ſown. They ſow 4 buſhels; the crop 4 quarters. For peaſe they give but one earth; of the white ſort they ſow 4 buſhels, but of the grey only 2—never hoe them; the crop 3 quarters.

They give 4 earths for turnips, hand-hoe twice. They have a particular method of uſing them, they draw the lands alternately; draw one and cart the turnips on to a clover lay, then leave one, then draw another; and ſo on. Thoſe they carry off they give to beaſts for fatting, or to milch cows, with a crib of ſtraw in the field; and the remainder of the crop they feed on the land with ſheep, and ſometimes with beaſts.—The crops are in value, from 21 *s.* to 4 *l.* 10 *s.*; average about 40 *s.* fed off.

They mow the firſt and ſecond growths of clover for hay; which they do not only on account of the hay, but under the experimental certainty of the wheat that ſucceeds being much better than after feeding:

I repeated my enquiries on this head, to know if it was only a private opinion, or a general obſervation and practice; and I was anſwered the latter.

Buck-wheat they plough twice for, and always mow it for ſeed; then they dung the ſtubble, and ſow wheat on one earth, in which method they never fail of good crops of that grain.

Carrots are not an uncommon crop here. They plough up the ſtubble deſigned for them in autumn, and on that ploughing manure with long yard dung, 10 loads an acre; which they turn in by a trench ploughing, with two ploughs, one a pair of horſes, and the other following in the ſame furrow with 4. In *February* the ſeed is harrowed in. It is generally 2 months before the carrots come to the hoe; they have three hoeings given, at the expence of a guinea an acre. They take up the crop with a three pronged fork, as it is wanted, never ſtowing them for ſecurity in a houſe. I could find no clear idea of the quantity produced on an acre, nor of any other value than that of 1 *s.* 2 *d. per* bunch of 120, as large as a man's wriſt; which is the price of *Norwich* market. Barley is always ſown after them.

The beſt farmers chop their ſtubbles for manure; but it is not general. All ſtack their hay at home.

They have good marle all over the country, but not much uſed. But Mr. *Henry Raven* of *Brammerton*, has introduced claying; he lays 70 loads an acre with great ſucceſs.—The only uſe made here of marle is however a very good one; they form compoſts of it with earth, farm-yard dung, &c. and mixing them well together, ſpread it for turnips, and find very great benefit from the practice.

Aſhes they uſe ſometimes on ſtrong wet land.

They do not fold their ſheep.

Soot they lay on graſs lands, and alſo on wheat in the ſpring; 30 buſhels an acre, at 6*d.*: It does great ſervice for one crop, and is ſometimes of benefit to the ſucceeding one.

Malt-duſt they uſe in the ſame manner; 40 buſhels an acre, at 4 *d.*

Norwich manure of all ſorts they have for 1 *s.* a four horſe cart load; they uſe much of it, and find it anſwers greatly.

Graſs land lets from 40*s.* to 3*l.* an acre; but about *Brammerton* at only 20*s.* An acre will, about *Norwich*, carry a cow through the ſummer; but at *Brammerton* it takes 1 ½. Dairies let at 3*l.* 5*s.* to 3*l.* 10*s.* a cow. At *Brammerton* they keep about a hog to every cow.

A dairy-maid will take care of 20 cows; ſome will undertake 30. The winter food of cows turnips, and ſtraw in the yard chiefly.

Swine fatten to 16 ſtone.

Flocks of ſheep at *Earlham* are from 300 to 600; but few at *Brammerton*.

The profit,

Lamb, - -	£.0	7	6
Wool, - - -	0	1	0
	0	8	6

The winter food turnips.

In their tillage, they reckon 6 horſes neceſſary for 100 acres of arable land; uſe 2 in a plough, and do 2 acres a day, 5 inches deep. The price 2*s.* 6*d.* an acre. They cut much ſtraw into chaff.

The time of ploughing ſtubbles for a fallow, autumn.

They reckon, on hiring farms, that three rents will ſtock.

Freehold eſtates ſell at 27 years purchaſe; copyhold 22.

Tythes are generally compounded.

Poor rates at *Brammerton* 2 *s.* in the pound. At *Earlham* 1 *s.* 9 *d.* They are in both places doubled in twenty years.

Particulars of a farm at *Brammerton*.

100	Acres in all	36	Barley
90	Arable	18	Turnips
10	Graſs	18	Clover
£.65	Rent	1	Man
5	Horſes	1	Boy
8	Cows	1	Maid
18	Acres Wheat	1	Labourer.

LABOUR.

For the harveſt, 2 *l.* 2 *s.* and board.

In hay-time, 1 *s.* 6 *d.* and beer.

In winter, 1 *s.* and beer at *Brammerton*; 1 *s* 2 *d.* at *Earlham*.

Mowing graſs, 1 *s.* 6 *d.* an acre and beer.

Hoeing turnips, 4 *s.* and 2 *s.*

Filling cart, 25 *s.* *per* 120 loads.

Firſt man's wages, 10 *l.* 10 *s.*

Second ditto, 6 *l.* 6 *s.*

Lad's, 3 *l.*
Dairy-maid's, 4 *l.* 4 *s.*
Other ditto, 3 *l.*
Riſe of labour in 20 years a ſixth.

PROVISIONS.

Bread, – –	1 ¼ *d. per lb.*
Cheeſe, – –	2 ½
Butter, – –	7
Beef, – –	3 ½
Mutton, – –	3 ¾
Veal, – –	3
Bacon, – –	6
Milk, – –	1 *d. per* pint.
Potatoes, – –	6 *per* peck.
Candles, – –	7 *per lb.*

Houſe-rent, 4 *l.* out of *Norwich.*
——————— in ditto, 2 *l.* 10 *s.*
Firing in ditto, 40 *s.*
——— in the country, 20 *s.*

Nockold Thompſon, Eſq; of *Norwich*, has executed ſome experiments at *Earlham*, which will prove ſufficiently how capable the country is of improvement.

When this gentleman began farming, his land yielded very poor crops, being all in extreme bad order. None of the fields produced more than 2 or 2 ½ quarters of barley; no wheat was grown, only rye, and that indifferent: nor did the clover or turnips amount in weight to half what he now gains. The following is the regiſter of his fields.

No. I. *Five acres.*

1768.

Manured, 12 loads an acre, with a compoſt made of *Norwich* dung, marle, and earth, in equal quantities, and ſown with barley; the crop very good.

1769.

This year it yielded coleſeed; was hand-hoed like turnips, and weeded; the produce 4 ½ quarters *per* acre; ſold for 10 *l.* This practice of hand-hoeing coleſeed cannot be too much commended; it is no where common.

1770

Manuring for wheat.

No. II. *Nine acres.*

1768.

Yielded barley after wheat, 3 ½ quarters *per* acre.

1769

Manured with compoſt as above: ſown

with turnips; carted half off, and the other half fed on the land: the crop would have ſold, from the great ſcarcity, for from 5 *l.* to 7 *l.* an acre.

1770.

Buckwheat.

No. III. *Nine acres.*

1768.

Manured with the compoſt for turnips; half fed off as above; the value 2 *l.* 10 *s.* Some of them came to 14 *lb.* weight.

1769.

Barley, 3 quarters an acre.

1770.

Clover mown; 3 loads of hay an acre at one cutting, 46 *s.* a load.

No. IV. *Eleven acres.*

1768.

Manured as above with compoſt; and ſown with barley: the produce 2 ½ quarters an acre.

1769.

Again manured with ditto.——Clover, mown for hay, a load an acre.

1770.

Wheat; will be 3 ½ quarters.

No. V. *Twelve acres.*

1768.

Manured as above with the compoſt for wheat, on a clover lay. The produce 4 quarters an acre.

1769.

Barley, 2 ½ quarters an acre.

1770.

Manured again with the compoſt, and ſown with turnips; the crop very fine.

No. VI. *Eleven acres.*

1768.

Barley after clover, the crop 3 ½ quarters.

1769.

Manured with the compoſt, and ſown with turnips; the crop very good.

1770.

Oats; at leaſt 5 quarters.

No. VII. *Eleven acres.*

1768.

A corky ſoil; manured with the compoſt for clover.

1769.

Peaſe, 2 quarters.

1770.

Manured for carrots and turnips; fine.

No. VIII. *Nine acres.*

1768.

A clover lay in 1767, manured with the compoſt for wheat; the produce 4 quarters *per* acre.

1769.

Barley, 2 ½ quarters.

1770.

Manured with compoſt for cabbages and turnips; the crops extremely fine.

No. IX. *Seven acres and an half.*

1768.

Manured with the compoſt for turnips; the value 3 *l.* an acre.

1769.

Barley, 2 ½ quarters.

1770.

Clover, 3 loads an acre.

No. X. *Eleven acres.*

1768.

An old meadow broken up in 1766 for oats, and oats again in 1767; clover with them; marled the clover lay, 70 loads an acre; fed the crop with horſes, cows and ſheep.

1769.

Manured with the compoſt for wheat; the crop 4 ½ quarters *per* acre.

1770.

Barley; a good crop.

No. XI. *Three acres and an half.*

1768.

Manured with compoſt for turnips; the crop very fine.

1769.

Lucerne in drills.

1770.

Ditto, manured with compoſt.

No. XII. *Seventeen acres.*

1768.

Barley, 3 ½ quarters.

1769.

Clover; manured with the compoſt; the crop a load and half of hay.

1770.

Wheat; promiſes fair for 4 quarters.

No. XIII. *Seven acres and an half.*

1768.

Barley, 3 ½ quarters

1769.

Clover, 1 ½ load. Manured with compoſt.

1770.

Charlton peaſe, and white ditto—the latter the beſt.

No. XIV. *Seven acres.*

1768.

Turnips, manured with compoſt; worth 3*l.* an acre.

1769.

Barley, 3 quarters.

1770.

Clover, 3 loads hay.

No. XV. *Eleven acres.*

1768.

Peaſe; white and grey: the white 3 ½ quarters: the grey, 1 ½.

1769.

Manured with compoſt for turnips; the crop a fine one.

1770.

Oats, very good.

No. XVI. *Four acres and an half.*

1768.

Clover, 1 ½ load.

1769.

Manured with the compoſt for wheat; the crop 4 quarters.

1770.

Barley.

No. XVII. *Two acres and an half.*

The ſame as No. 16.

No. XVIII. *Eight acres and an half.*

1768.

Old paſture, marled; 50 loads an acre.

1769.

Peaſe, 3 ½ quarters.

1770.

Wheat; will be 4 ½ quarters.

No. XIX. *Five acres and an half.*

1768.

Paſture.

1769.

Ditto.

1770.

Peaſe———good.

All the preceding crops of wheat were manured with a dreſſing of malt combs or ſoot, in *February*, about 30 buſhels an acre.—The ſmallneſs of the crops of barley muſt be ſtriking; the wheat exceeds it. This is owing to following wheat, and alſo to half the benefit which barley uſually receives from turnips, being transferred to the wheat, by the turnips being drawn and fed on the clover lays; and the wheat has alſo the ſuperior advantage of the ſpring top dreſſing. It ſeems to appear from this regiſter, that all the turnips ought to be fed on the land for the barley. But Mr. *Thompſon*'s marling and compoſt manuring has brought his farm into excellent order; and made it yield far different crops from what it did before.

CARROTS.

Experiment, No. 1.

Three acres of gravelly and ſandy loam on chalk, and marle, were ploughed in autumn 1769, and again in *February*, upon which earth 10 loads an acre of long ſtable dung were ſpread, and turned in by a trench ploughing, and the ſeed harrowed in; but it proved bad, and the ſeaſon was very cold and unfavourable. They were long in the ground before ſprouting;—but by two good hand-hoeings have gained a fine appearance. I found them a very promiſing crop they are to be hoed again.

CABBAGES.

Four acres of a good light mixed loamy ſoil were ploughed at *Michaelmas*; again in *February*, and a third time in *March*. Upon this earth it was manured with the compoſt, 12 loads an acre, and turned in in *June*. The ſeed, 3 *lb.* was ſown in a garden the middle of *April*. The ſort, the great *Scotch* cabbage. The plants were pricked out when in 2 leaves, 6 inches ſquare. The 20th of *June* they were tranſplanted into the field in rows 3 feet aſunder, and the plants 18 inches diſtant. It was done by the ſlight mark left by the plough in ſtriking every fourth furrow; and the rows are quite ſtraight. This is a very eaſy way of planting, in ſaving the complex and troubleſome exactneſs of a line, which is otherwiſe neceſſary on flat land. The appearance of the crop is very fine, and promiſes to yield at leaſt 30 tons an acre, and the whole plantation is perfectly clean.

LUCERNE.

Experiment, No. 3.

Three acres of a loamy ſand with ouzing ſprings under it at the depth of 6 or 7 feet (unknown at the time of ſowing) were cropped with turnips in 1768, well manured for. It was ploughed the beginning of *February*, and had two earths more before *April*, in the middle of which month it was drilled with lucerne in equally diſtant rows, 18 inches aſunder; it was kept quite clean by hand-hoeing; and cut once, in *Auguſt*, which cutting was given to horſes in the ſtable.

1770.

In *March* it was cleaned by hand-hoeing, at a very heavy expence. The latter end of *May* it was cut in portions for horſes as before; but the crop not large—not near equal to clover at the firſt cutting. Had it been made into hay, the produce would have been about a load an acre.

The beginning of *July* cut it a ſecond time; the produce the ſame as before; and after cutting it was again hand-hoed.

Began to cut it the third time the firſt of

Auguſt, at about a foot high. But I did not find it clean.

The produce may therefore be calculated at three cuttings, each giving a load of hay an acre, the quantity of which three loads eaten green by horſes, will not be of leſs value than five loads of common hay: this is no trifling produce. But lucerne, unleſs it is kept as clean as a garden, never yields its full product: As Mr. *Thompſon* cleaned it only by hand, he found the expences to over-balance the produce; I recommended the ſhim for the intervals, and to harrow it acroſs to extirpate the weeds that come up in the rows; and he is determined to try that method.

IMPROVEMENT OF MEADOWS.

Experiment, No. 4.

Mr. *Thompſon* found ſeveral of his lower grounds, called meadows, quite boggy; and yielded nothing but a cold ſower graſs, and ruſhes; the utmoſt they were worth was 10*s*. an acre. In the ſpring of 1768, he mowed the ruſhes twice, and then drained the whole by deep and wide cuts: after which, he manured the whole with the uncovering of a marle pit, called here the *callow*, 30 loads an acre. Upon this manuring he ſowed *Dutch* clover and *Suffolk* hay ſeeds, and harrowed and rolled them in: they ſprung well; and the effect was very advantageous.

1769.

This year the ruſhes were again mown twice, and the drains opened. The improvement greater ſtill.

1770.

This year above half the breadth was broken up, and there has been a very exact rule for deciding the value of the improvement. The whole piece was 45 acres; now only 20, and this 20 has fed exactly the ſame cattle that the whole did before: It could now be let for 30*s.* an acre.

CLEARING AWAY WEEDS.

I mention this part of good huſbandry to obſerve, that Mr. *Thompſon* makes it a regular practice to mow all the weeds in his hedges, borders, ditches, &c. and alſo in the adjoining lanes, before they ſeed; and he finds his account in this excellent practice by keeping his farm clean.

MARLE.

The marle dug at *Earlham* is rather hard, and like chalk on the firſt digging; but it breaks in pieces eaſily, and on being thrown into water will diſſolve in a quarter of an hour and be ſoapy: if powdered, it efferveſces immediately with vinegar: the colour is white, with a tinge of a reddiſh yellow. He finds that the deeper it is dug, the better it is. It deſtroys weeds almoſt at once, particularly ketlocks and poppies. Theſe were common in his fields, but have diſappeared ſince the marling. He lays from 40 to 70 loads an acre when alone, but generally mixes it with dung.

NORWICH MANURES.

Mr. *Thompſon* buys 400 loads of dung, &c. from *Norwich* every year, at the price of 1*s.* and he reckons the carriage 2*s.* 6*d.* more: he always forms it into a compoſt with marle, &c. Lays a bottom of marle; then a layer of virgin earth, then dung, both the *Norwich* ſort and the farm-yard; and then covers the whole heap completely with marle. After laying ſome time, it is turned over and mixed well together.

He brings from *Norwich* ſtable-dung, and ſweepings of ſtreets; alſo the riddance of privies mixed with coal aſhes; likewiſe hops from a brewhouſe: and large quantities of ſoot and malt-duſt for top dreſſings of wheat.

COURSE OF CROPS.

This is particularly ſet forth in the table of fields given above: but Mr. *Thompſon* has made one remark which ſhould be mentioned. He finds that the barley after the turnips eaten laſt is always very poor, owing to being ſown late. This has determined him to ſow buck-wheat on ſuch lands in future; and wheat after it. This obſervation I do not remember hearing ſo particularly remarked before; but it is certainly an evil attending a crop of late turnips; and the remedy here propoſed will in all probability anſwer well on many ſoils: but clover muſt be harrowed in upon the wheat in ſpring, or that neceſſary crop is left out of the courſe.

SWINE.

This gentleman obſerved that the meadows which he fed with his horſes and cows, were eaten very uneven; much graſs remaining untouched: this induced him to try ſwine in grazing them, and it has anſwered; they aſſiſt ſo well, as to keep the graſs fed level: and he eats it in general with them cloſe at *Michaelmas*, for the young crop in the ſpring to come the better. He likewiſe has fed them entirely on clover, but does not make it a conſtant practice, as it anſwers much better to mow that crop, where hay ſells from 2*s*. 6*d*. to 3*s*. 4*d*. *per C. wt.* He keeps the lean ones in winter on turnips and malt grains. Propoſes to fat on carrots and buck-wheat.

The following are the particulars of Mr. *Thompſon*'s farm when got in perfect order

200 Acres in all
170 Arable
30 Graſs
14 Horſes
27 Cows
12 Young cattle
60 Sheep

50 Swine
3 Men
3 Boys
2 Maids
8 Labourers
30 Acres wheat
40 Barle

10 Oats
10 Peaſe
30 Turnips
30 Clover
6 Carrots
4 Cabbages
3 Lucerne
7 Sainfoine
5 Coleſeed.

It cannot be doubted but this farm will do excellently well for carrots——cabbages——lucerne——and ſainfoine.——I have little doubt but Mr. *Thomſon* will find thoſe crops uncommonly profitable, and eſpecially as he is in ſo good a ſyſtem of manuring; ſufficient to keep any farm in great heart.

The ſoil changes between *Earlham* and *Bracon Aſh*; the further this way you move, the heavier the land grows——there being much more clay in this country than about *Norwich*. But they have various tracts of gravelly and ſandy loams; and alſo looſe wood-cock brick earths. It lets on an average at 15*s.* an acre. Farms riſe from 16*l.* to 200*l.* a year; general average 120*l.* The courſes,

1. Turnips
2. Barley
3. Clover and ray-graſs
4. Wheat
5. Turnips
6. Barley
7. Trefoile and ray-graſs
8. Wheat
9. Oats.

The oats come in very badly, and muſt do miſchief: the change from the clover to trefoile, is on account of the clover having of late years failed very much, but by introducing trefoile alternately, this evil is quite prevented.

For wheat they plough but once, ſow 2 or 3 buſhels an acre, and gain 3 ½ quarters. For barley they plough thrice; ſow 3 buſhels, and get 4 quarters an acre. For oats they vary their tillage from once to three times; ſow 4 buſhels, and reap 5 quarters on an average. They give but one earth for peaſe; ſow 3 buſhels; ſometimes dibble them in on a clover or trefoile ſtubble, in which way only 2 buſhels are uſed; the crop on a general average 3 quarters.—They never hoe.

They ſtir four or five times for turnips, hoe them twice, and uſe them all ways; the value about 40 *s.* an acre. They mow their clover twice; the firſt cutting yields about 2 loads of hay an acre, the ſecond one: ſome leave the latter for ſeed.

Buck-wheat they ſow as a preparation for wheat, 6 pecks *per* acre; the crop 3 ½ quarters. The price varies; it is often higher than barley; but the rate of that grain is the common rule.

Marle is not regularly found in this country; when they can get it, they lay from 80 to 100 loads an acre, and find it a very great improvement of light lands.

The beſt farmers chop their ſtubbles for manure; but many neglect it: all ſtack their hay at home, and moſt of them bring dung from *Norwich*, though 7, 8, or 10 miles off.

Plaſhing hedges quite unknown here; they cut off *all* the live wood, when they repair.

Good graſs land will let at 20*s*. an acre: they apply it both for grazing and the dairy. An acre and quarter will carry a cow through the ſummer: they give 6 ½ *lb*. of butter each *per* week; and a good one 6 gallons of milk a day. The total produce 4*l*. 15*s*. a year. The winter food ſtraw and turnips, and a little hay in ſpring. In the nights they keep them in the yard, but in the field by day.

The graziers buy *Scotch* beaſts chiefly; though ſome home-bred ones: If they give 5*l*. and keep them a year on graſs and turnips,

nips, they do not more than double their money.

Their ſwine fatten to 16 ſtone. Flocks of ſheep riſe only to 100. In autumn they buy in lambs; and ſell them in ſpring. They turn them firſt into the ſtubbles; after which they put them to turnips; they buy at 7*s.* and ſell at 11*s.*

In their tillage, they reckon 8 horſes neceſſary to 100 acres of arable land; uſe 2 in a plough, and do an acre a day: which quantity is a great falling off from that performed ſo little a way from them. They plough 3 inches deep: the price 2*s.* 6*d.* an acre; which is as low, as where they do 2 acres a day. They very ſeldom cut any ſtraw into chaff. Their ſtubbles they plough up for a fallow in autumn: uſe only wheel ploughs.

In the hiring and ſtocking farms, they reckon 300*l.* neceſſary for a farm of 100*l.* a year: for thoſe who have caſh enough for 60*l.* a year, are ſure to hire a hundred —a miſtake much complained of by landlords.

Land ſells at 32 years purchaſe. Tythes

are compounded; they pay 2*s.* 6*d.* or 3*s.* in the pound.

Poor rates, 2*s.* to 3*s.* in the pound; they are doubled in 20 years. The employment of the poor women and children, ſpinning wool. All drink tea twice or thrice a day.

Moſt of the farmers have leaſes.

Rev. Mr. *Howman*, of *Bracon Aſh*, to whom I am obliged for the preceding particulars, has tried *Reynold*'s cabbage turnip on ſtrong clay land: It came to as great a ſize as common turnips on the beſt land, but grew ſo forky, and entwined its roots about ſo much earth, that half the crop was loſt. Cows eat them after a little difficulty.

Turnip cabbages he alſo cultivated on a ſtrong clay ſoil; the ſeed was ſown the beginning of *April:* the latter end of *May* the ſtrongeſt plants were drawn out to plant half a rood. The beginning of *July* they were again pricked for another rood. The ſeed bed itſelf was alſo half a rood—and what is remarkable, proved the fineſt of the three This experiment is very curious, for it ſeems to prove a point never recommended by any of the cultivators of cabbages, *viz.* that it is more advantageous to ſow where the plants are to remain, than to tranſplant them from a bed. This might eaſily be tried, and probably would be found a very good way of cultivating them.

Horſes, cows, and ſheep were turned in who fell at once on them, and eat the crop clean up; they all ſeemed to like them exceedingly. Some were left to the ſpring, to diſcover how long they would laſt. The beginning of *January* was a week's ſharp froſt without ſnow, which left the plants a mere rotten pulp. They did not come to a larger ſize than common turnips; but were much heavier than thoſe of an equal ſize.

This gentleman, on a ſtrong clay ſoil of 16*s.* an acre, gained the following crops:

Wheat, 3 ½ quarters.
Oats, 6 quarters.
Peaſe, 3 quarters.

Mowed from 2 to 3 loads of hay from his paſtures. But his management was very perfect, for he kept his fields under a conſtant manuring, from compoſt heaps,

made

made in layers of dung and earth, and well mixed together.

He attributes his good ſucceſs with his graſs lands, in ſome meaſure to mowing off all the weeds and leavings of his cattle, when they were fed.

Thomas Bevor, Eſq; of *Ethel* in this neighbourhood, has for ſome years kept part of his eſtate in his own hands, and cultivated it in a very complete manner; purſuing ſeveral practices not common in this country, which he has found of particular utility.

The courſe which he adheres to in preference to all others, is,

1. Turnips 3. Clover
2. Barley 4. Wheat.

For his turnips he ploughs 4 to 6 times; they are worth on an average 3 *l.* 3 *s.* an acre; when he draws them he has generally 40 great cart loads an acre: feeds his horſes on them to great advantage: ½ an acre will winter a cow. His barley yields 5 ½ quarters an acre: he ploughs 5 times for it; ſows 3 buſhels an acre. The clover produces 3 loads of hay, at 40 *s.* a load; and wheat upon an average, 4 ½ quarters:—

he ſows 2 buſhels; once tried 6 pecks, but it was the worſt crop he had. Theſe crops are all great, and could not be gained unleſs the management was excellent.

Turnips, - -	£. 3	3	0
Barley, - -	5	10	0
Clover, - -	6	0	0
Wheat, - -	9	0	0
Total, - -	23	13	0
Or *per* acre *per ann.*	5	18	3

I do not think that common huſbandry admits any thing more profitable than this. We ought to attend particularly to the management that enſures ſuch noble crops: it conſiſts chiefly in a very ſpirited conduct reſpecting manures.

He is principally ſolicitous to raiſe large quantities of farm-yard dung, as the cheapeſt and readieſt method of improving a farm. For this purpoſe he ſtacks all his hay at home, ready to be conſumed in the yard—he chops his ſtubbles, 25 acres, and carts them in for litter—he clears the lanes, &c. of fern, ruſhes, &c. getting 7 or 8 waggon loads yearly; all which he applies to the ſame uſe as his ſtubble. And one point, in which he is quite peculiar, is the raking together all the leaves that fall in his park; he employs women in this buſineſs, they load the carts with large fans; the whole expence of raking, loading, carting, &c. is 6*d.* a load. He annually collects 200 loads; they are ſpread about the yard, and the cattle tread them into one general hard cake, which, receiving the dung and urine all winter, converts into as rich a manure as any in the world. By theſe exertions of excellent management he raiſes annually 1400 large loads of dung; made by

20 Cows 11 Horſes
14 Young cattle 40 Swine.

Theſe confined the winter through, alſo 20 horſes joiſted on hay, with liberty of running in and out to the park at pleaſure, in all 105 head of cattle—but ſwine reckoned, we ſhould not call them more than 85, which is 16 ½ loads *per* head. A great quantity, conſidering that 20 horſes run out at pleaſure. Mr. *Bevor* carts theſe 1400 loads from his yard on to heaps, preparing layers of pond mud, ditch earth, ant-hills, waſh ſand, &c. &c. the dung is thrown on them, and then more layers of earth, &c. In this work, he is attentive to keep the carts off the heaps; they ſhoot down their loads by the ſide, and men are ready to throw them up with ſpades. He follows this method to prevent the carts driving on to the heaps, which he thinks preſs them too much, and thereby prevent the fermentation which rots the compoſt. He has tried the dung alone; and has found from long experience, that this mixture will do more benefit upon a given quantity of land, than the dung alone; and be ſuperior to a much greater degree, than the amount of the expences. He mixes the 1400 loads of dung with 600 of earth, &c. &c.—uſing annually 2000 loads. The quantity of the compoſt, after being well mixed together, that he ſpreads on an acre, is 12 loads, every other year.—

Beſides this general ſyſtem, which is undoubtedly excellent, he attends to other ways of improving his land.

Experiment, No. 1.

Buck-wheat he has ſown on a ſtrong clay land as a preparation for wheat, after four ploughings: it was partly fed off by cattle, and what remained ploughed in the end of *July*, and after two ſtirrings more, wheat ſown: the crop was 5 quarters an acre.

Experiment, No. 2.

An ordinary paſture was broken up and dibbled with peaſe; the crop 5 quarters an acre; the old turf was ſo rotten that Mr. *Bevor* intended wheat; but being prevented, he ſowed it with buck-wheat, 1 buſhel an acre; after which he ſowed wheat, and had 6 quarters an acre. This was ſucceeded by turnips; and it was laid down with graſſes among the following barley.

Experiment, No. 3.

Soap aſhes he has uſed on graſs land, with ſuch ſucceſs, that land let at 5 *s.* manured with 20 loads an acre, was improved by them to a guinea an acre rent.

Experiment, No. 4.

Ant-hills he tried once for manure, mixing them with dung. A large quantity was formed into a heap, which he turned over ſeveral times; till the whole was one

uniform

uniform maſs of putrid mould: it was quite black and moiſt: this he ſpread on graſs, and found the benefit of it fully equal to that of dung alone: and it has laſted longer than he apprehended that manure would have done.

Experiment, No. 5.

Mr. *Bevor* tried the burning of clay: it was of a hard ſtrong kind: he formed a heap with whins, ruſhes, ſtubble, and ſome turf; the clay calcined into bricks, which were broken and ſpread on the land; few aſhes. But the benefit has been very little.

In preſerving all the urine which runs from the farm-yards, &c. this gentleman is very attentive; he has a ſmall well to which it is conducted, with a pump fixed: as faſt as it fills, it is carted away in ſuch a machine as they water the roads about *London* with. He ſprinkles the worſt graſs with it, and finds it the means of preſently converting it into the beſt. This is an excellent practice, and cannot be too much recommended.

Experiment, No. 6.

Hearing it aſſerted that young ſwine would not do well on clover, he ordered ſome ſows and pigs to be turned all day long into the clover field with his other hogs; they were ſo, and no ill effect aroſe; they were as well, and throve as faſt as before. He has ſince adhered to the practice, and whenever a clover field, or part of one, is fed, *all* his ſwine, without diſtinction, have it.

This gentleman's farm conſiſts of

530 Acres in all
400 Graſs
130 Arable
£.400 Rent
40 Acres of graſs mown
32 Turnips
32 Barley
32 Clover

32 Wheat
22 Cows
20 Oxen
20 Young cattle
180 Sheep
100 Horſes
10 Colts and foals
40 Swine.

The number of horſes is owing to his taking many joiſt ones from *Norwich*, at 2 *s.* 6 *d.* a week, the year through; giving them hay in winter, for them to go to at pleaſure.

He keeps none but polled cows: that is,

without horns; on account of his plantations and hedges; and he finds they give more milk than others.

His ſheep are the *Lincolnſhire* breed, of which he finds he can keep in proportion to the *Norfolk* ones, as 3 to 5. If 500 of the latter, he can keep 300 of *Lincolnſhire*, and the latter will pay him much better than the 500 *Norfolks*. He clips 6 *s.* worth of wool from each.

Experiment, No. 7.

In planting, Mr. *Bevor* finds that *Scotch* firs, in 18 years, are worth 2 *s.* 6 *d.* A plantation of his taken through are of that value.

Experiment, No. 8.

A whole plantation of 50 years growth, worth 50 *s.* on an average: they ſtand 20 feet ſquare—which is 108 to an acre.

Experiment, No. 9.

In another plantation on a moiſt ſandy loam, larches of 18 years growth, are worth 3 *s.* 6 *d.*: Spruce firs among them not half ſo good, which Mr. *Bevor* attributes to their being trimmed up; others on ſame ſoil and growth, not ſerved ſo, are almoſt double the ſize.

—— *Rogers*, Eſq; of *Ethel*, has taken a farm, which he is improving, particularly by claying, and other manuring. He has three acres of cabbages. He ploughed for them five times, tranſplanted from the ſeed bed (ſown in *March*) in *June*, in rows 4 feet by 2 from plant to plant; and he has obſerved that the larger the plants at ſetting out, ſo much the better the crop; which is a matter of importance. I obſerved a great difference in the field; but it was owing alone to the plants being larger: they promiſe well, and are kept perfectly clean.—The following are the particulars of Mr. *Rogers*'s farm.

175 Acres in all
150 Arable
20 Graſs
£. 105 Rent
10 Horſes
2 Men
12 Labourers.

—— *Berney*, Eſq; at *Bracon Aſh*, has made great improvements by planting land of 20 *s.* an acre.

Oak, of 50 years growth, are worth

15 *s.* each: they ſtand 15 feet ſquare; this is 180 on an acre.

Larch, in 18 years, (20 from the ſeed) are worth 6 *s.* each: they grow out of underwood that pays 20 *s.* an acre. Some few of 20 years, worth 15 *s.* each. Silver firs in the ſame wood not quite ſo large, but they beat both the ſpruce and *Scotch*. They all ſtand 15 feet ſquare in the underwood.

In another plantation without underwood, *Scotch* firs of 18 years, are 2 *s.* 6 *d.* each: they ſtand 8 feet ſquare; which is 680 on an acre, or 85 *l.*; that is, 4 *l.* 14 *s.* *per* acre *per annum*, excluſive of thinnings.

An adjoining plantation of ſpruce, of the ſame age and diſtance, are worth 4 *s.* each, which is 136 *l.* *per* acre; or 7 *l.* 6 *s.* *per* acre *per ann.* from firſt planting, and excluſive of thinnings. No huſbandry will equal this. A man who would plant for profit muſt not regret land of 20 *s.* an acre.

Weymouth pines, in 18 years, much larger than *Scotch* firs of 22 years.

Mr. *Dorney* has found it beſt to trim up the firs.

Plate VI. Vol. II. pa. 161.

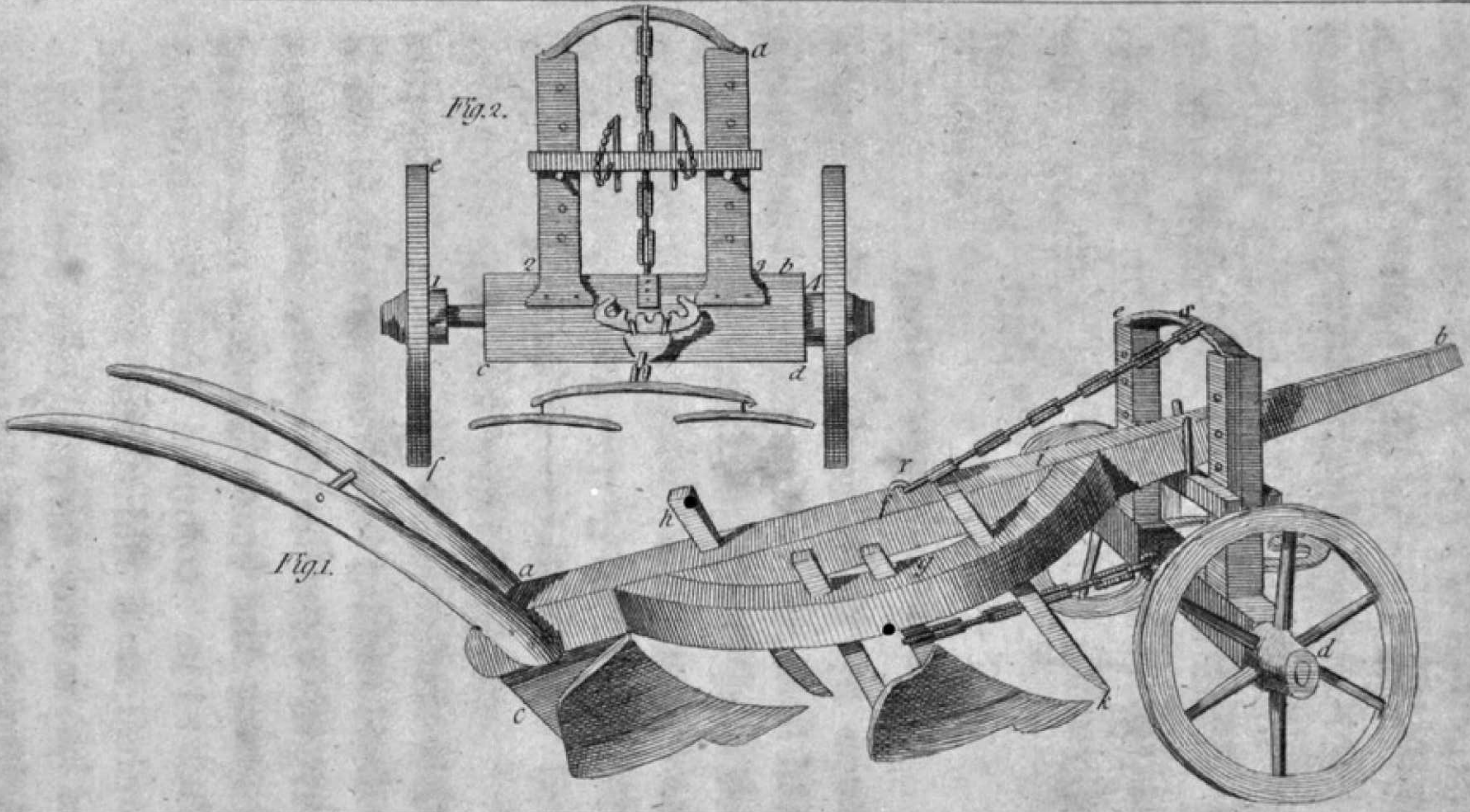

Plate VI. Fig. 1. repreſents an improvement made by Mr. *Berney* in the double plough, of which I gave a plate in Vol. 3. of my *Six Months Tour through the North of England.*

From a to b. —— 7 feet 6 inches.
c to d. —— 6 feet.
b to d. —— 3 feet 6.
h to i. —— 3 feet.
f to g. —— 6 inches.
e to b. —— 2 feet.
c to k. —— 4 feet 8.
r to s. —— 31 inches.

Fig. 2. the carriage in front. From 1. to 2. is four inches wider than from 3. to 4.

From a to b. —— 20 inches.
c to d. —— 28 ditto.
c to f. —— 26 ditto.

Two horſes only are uſed in it, by this means of raiſing the front carriage ſo much higher than in the old one, and alſo by ſhortening the beam ſo much. It worked againſt the common *Norfolk* wheeled ploughs; and did with 2 horſes, three acres in the time they did two.

Several very important trials in huſbandry and planting have been executed by *William Fellowes*, Eſq; of *Shotteſham.*

Experiment, No. 1

To diſcover which was the beſt manure for turnips, yard dung or earth mixed with lime, a field was divided into two parts: one half dunged with 12 loads an acre, directly from the yard to the land; the other half, 30 loads an acre of earth mixed with 3 chaldron of lime. The former part turned out much the beſt.

Experiment, No. 2.

Wheat Mr. *Fellowes* drills in equally diſtant rows, 18 inches aſunder, and hand-hoes it twice, at 2 *s.* 6 *d.* an acre each time. I viewed it with great pleaſure, for not a weed was to be ſeen; it is calculated at 3 ½ quarters *per* acre; which is a better crop than moſt broadcaſt hereabouts.

There was likewiſe ſome wheat drilled with 4 feet intervals. I examined the ears, and found them not at all larger or heavier than thoſe of the 18 inch rows.

Experiment, No. 3.

Some ſeed of the great *Scotch* cabbage was ſown the 10th of *March*; and in *May* tranſplanted into the experiment field, in ſquares of 2 feet 6 inches, upon a well tilled turnip loam, manured with 20 loads of dung an acre. I found them very fine, and perfectly clean; turnips were on one ſide of them, ſo that Mr. *Fellowes* will be able to ſee which will laſt longeſt good—and yield the beſt crop.

Experiment, No. 4.

In 1765, two acres of a light loamy ſoil, manured with 12 loads an acre yard dung, were ſown with carrots the beginning of *April*, 4 *lb.* of ſeed *per* acre. They were hand-hoed thrice, at the expence of a guinea an acre.

They were taken up with forks as wanted; the product 20 loads an acre, 30 buſhels each or 600 buſhels; which, at 1 *s.* a buſhel, is 30 *l.* *per* acre. They were all uſed for horſes, kept all winter in a ſmall dry graſs cloſe: the carrots were thrown about the field. No horſes could do better, or be freer from diſtempers.

Experiment, No. 5.

In 1766; four acres of the ſame ſoil were ploughed four times, the third time in the trenching manner, one plough following another in the ſame furrow, gaining a depth of 10 inches; after which it was ploughed in the common manner, and 4 *lb. per* acre of ſeed harrowed in: they were hoed thrice, at a guinea an acre. The crop was uſed in the ſame manner as that of 1765; and was as good a one. Some cows being turned in with the horſes, the butter received an higher colour, but was improved in flavour: none could be finer.

Experiment, No. 5.

In 1767, four acres in the ſame field were ſown, upon the ſame preparation as the preceding year. They were given to cows and horſes in the former manner, and turned of incomparable uſe. Numbers of the carrots weighed 3 or 4 *lb.* but the general average was not more than 1 *lb.* They were ſet out at 8 inches diſtance from each other in general; but ſmall ſpots failing, that diſtance, Mr. *Fellowes* apprehends, was encreaſed in the whole field to 10 or 11; but I ſhall ſuppoſe to 12. There would then be 43560 carrots on an acre, which, at 1 *lb.* each, amounts to 19 tons 9 *C. wt.* and ſuppoſing a buſhel to weigh 56 *lb.* it is 778 buſhels on an acre, which at 1 *s.* comes to 38 *l.* 18 *s.*; at 6 *d.* only, they come to 19 *l.* 9 *s.* *per* acre. And to ſhew the undoubted greatneſs of the value of a carrot crop; allow 2 ſquare feet to each carrot, which would make them all far greater than 1 *lb.* weight; the crop in ſuch caſe, at 6 *d.* a buſhel, would be 9 *l.* 14 *s.* 6 *d.* an acre. But I know from various experiments of my own, that they will pay in feeding cattle 1 *s.* a buſhel.

Experiment, No. 6.

In 1768, four acres more of the ſame ſoil were ſown with carrots, the culture, produce, and expenditure, the ſame as the year 1767.

Experiment, No. 7.

In 1769. Six acres were ſown; the ſucceſs the ſame.

Experiment, No. 8.

This year, 1770, the crop is four acres, in the ſame experiment field; 6 *lb.* *per* acre of ſeed were ſown; the crop is regular, clean, and very fine. Mr. *Fellowes* is clear that they will come to 1 *lb.* each on an average; of which I have not any doubt.

Barley has been conſtantly ſown after the carrots; and reſpecting their value as a preparation for that grain, he is very clear in his account: the crop is always much ſuperior to that which follows turnips drawn; but ſomething inferior to ſuch as ſucceed turnips fed on the land.

Obſervations.

Theſe experiments on carrots are very valuable; the facts to be drawn from them are perfectly ſatisfactory, in being the reſult, not of a ſingle vague trial or two, but a regular proſecution of an eſtabliſhed huſbandry. The carrot crop, though ſmall, is as certain a one as any other on Mr. *Fellowes*'s farm. It evidently appears that they yield a very conſiderable quantity of produce, and that produce of uncommon uſe in feeding both horſes and cows.

But the idea of the value of a crop is throughout this country extremely indeterminate, and below the truth. From four to ſix or ſeven guineas an acre, have been thought high prices. This ſtrange circumſtance has been owing to two cauſes; firſt, the price at *Norwich*, which is not half what I experimentally know them to be worth in feeding cattle; and, ſecondly, to a want of keeping minutes of the conſumption.

Carrots are worth 1 *s.* a buſhel of 56 *lb.* in feeding horſes or oxen; or in rearing, feeding, or fattening ſwine: But the clear method of knowing their value is to buy a lot of hogs or oxen, fat them with ſo many hundred buſhels of carrots, then ſell them: the value of the carrots is decided at once.

Let us calculate the profit of the preceding crops.

Expences.

Rent, tythe, and town charges, £.	1	1	0
Five ploughings and harrowings,	0	16	0
6 *lb.* of Seed, - -	0	8	0
Sowing, - - -	0	1	0
12 Loads dung, directly from yard, ſuppoſe - - -	1	10	0
Hoeing, - - -	1	1	0
Taking up, ſuppoſe -	0	12	0
Carting from field, ſuppoſe	0	5	0
	5	14	0

Produce.

778 Buſhels, at 1 s. –	£.38	18	0
Expences, – –	5	14	0
Profit, – – –	33	4	0
If each carrot is only ½ *lb.* it is 389 buſhels, which, at 1 *s.* is	19	9	0
Expences, – –	5	14	0
Profit, – –	13	15	0

And lower than this it cannot reaſonably be eſtimated. This profit on a crop which keeps ſo much ſtock, and conſequently raiſes a prodigious quantity of dung, at the ſame time that it prepares the land for barley, ought to induce the farmers to cultivate it upon a large ſcale: they would aſſuredly find it the moſt beneficial article in *Britiſh* huſbandry.

Rents about *Shotteſham* riſe from 8 *s.* to 20 *s.* an acre; the average about 14 *s.* The general courſe is,

1. Turnips, worth 2 *l.* 2 *s.*
2. Barley, 3 ½ quarters *per* acre.
3. Clover, worth 3 *l.* 3 *s.* an acre.
4. Wheat, 2 ½ quarters.

But it is found pretty generally that clover fails much more than formerly: it comes up very thick and fine, but dies away in the winter——Mr. *Fellowes*, by means of more ſpirited management, gets better crops; his wheat 3 ½ quarters, his barley 4, and has up to 6; and his turnips 2*l.* 10*s.* No farm can be neater, or carry greater marks of its being in the hands of a gentleman. He has graſs borders 15 feet wide around all his fields, which are mown for hay and kept level, and free from ruts: and either ſingle or double rows of elms run along many of them, for the pleaſure of walking in the ſhade, beſides the beauty of the object. I obſerved alſo, that the fences throughout his farm were in excellent order; regular, and free from gaps and rank weeds.

Mr. *Fellowes* has given yet greater attention to planting than to huſbandry, and has tried various trees, ſome years ago, ſo that he is now able clearly to judge which is the moſt profitable.

Experiment, No. 9

A plantation of *Scotch* firs of 45 years growth, 20 feet ſquare, on land of 15*s.* an acre, are now worth 20*s.* each on an average. At that diſtance there are 108 trees on an acre, or 108 *l*; which is 2*l.* 9*s.*

per acre *per ann.* from the firſt planting, excluſive of thinnings, which would more than double it. But the graſs under the trees would have let, for many years paſt at 7*s.* an acre.

Experiment, No. 10.

Another plantation of *Scotch* firs, 38 years growth, ſtanding in rows 14 feet wide and 10 in the rows, are now worth 12*s.* on an average. This diſtance gives 300 on an acre; and at 12*s.* come to 180*l.* or 4*l.* 14*s.* *per* acre *per annum*, beſides thinnings. The rent of the land 15*s.*; poor rates 1*s.* 3*d.* in the pound; and tythe, till 20 years old, 5*s.* an acre; the graſs under them now 5*s.* an acre. It is ſufficiently evident that no huſbandry can equal this.

Experiment, No. 11.

Cheſnuts in 38 years*, on the ſame land, ſtanding 14 feet by 10, are worth 15*s.* each. This is 225*l.* *per* acre; or 5*l.* 16*s.* *per* acre *per annum*, beſides thinnings.

Experiment, No. 12.

Scotch firs in 38 years, on the ſame land, meaſure 17 feet of timber on an average, for which Mr. *Fellowes* has been offered 11*d.* a foot; that is 15 *s.* 7 *d.* a tree. They ſtand 14 feet by 10. An acre would therefore be 233 *l.* 15*s.*; or 6 *l.* 3 *s.* *per* acre *per annum*, beſides thinnings. Theſe trees are 60 feet high.

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* Note that all theſe ages are from the ſeed; not the planting.

Experiment, No. 13.

On the ſame land larch trees, of only 31 years growth, are as large as the firs of Experiment, No. 12. which ſhews that the larch is a much quicker grower. Spruce by them, not ſo large as either. The pinaſter of 38 years, larger than the *Scotch*. The cedar of *Lebanon*, of the ſame age, would now cut into planks 12 inches wide.

Experiment, No. 14.

A very ſtriking compariſon between the larch and the ſpruce fir, was tried by planting an old gravel pit levelled, ſurrounded by a plantation of *Scotch* fir, with thoſe two ſorts in alternate rows. The larch is from 6 to 12 feet high; whereas the ſpruce is but 2 feet on an average.

Experiment, No. 15.

A large plantation of many acres of a poor gravelly land, at 8 *s.* an acre, containing *Scotch* and ſpruce firs and larches, is now 16 years old; they are in ſquares of 10 feet, and are worth;

The *Scotch*, 2 *s.* 6 *d.* each.
The ſpruce, 3 *s.* 6 *d.*
The larches, 4 *s.* 6 *d.*

At ten feet, there are 435 trees on an acre.

The *Scotch*, at 2 *s.* 6 *d.* come to 54 *l.* 7 *s.* 6 *d.*; or *per* acre *per annum*, 3 *l.* 7 *s.*

The ſpruce, at 3 *s.* 6 *d.* to 76 *l.* 2 *s.* 6 *d.*; or *per* acre *per annum*, to 4 *l.* 15 *s.*

The larch, at 4 *s.* 6 *d.* to 97 *l.* 17 *s.* 6 *d.*; or *per annum*, 6 *l.* 2 *s.*

All three excluſive of thinnings.—Suppoſe we calculate theſe at no more than paying the rent, tythe, and town charges; and that the larch, in 20 years, come only to 100 *l.* which is however under the truth; let any one calculate the profit of hiring land on a 21 (or more) years leaſe, and immediately planting. In what other application of the land can ſuch great profit be made, as gaining 6 *l.* an acre without any riſque, and almoſt without any expence? It is true, ſuch a conduct cannot, like the culture of corn and graſs, be general, for reaſons obvious to every one—but as far as the whole demand of any neighbourhood extends, it is profitable to execute it Such a demand is every where very great, for the uſe of rails, ſpars, beams, board, planks, &c. &c. according to the age of the trees; and great quantities of theſe are perpetually importing from the *Baltic*. So far, therefore, as the demand extends, it is highly adviſeable to plant theſe trees.

Suppoſe 5 acres of larch planted every year; at the end of 16 or 17 years, five acres will every year be cut down, of the value of 500 *l.*: from that day a regular product of 500*l.* a year is gained from the application of 100 acres of land. Let to a tenant, theſe 100 acres produce 40 *l.* a year; but planted, they produce 500*l.* a year. What an amazing difference.

Suppoſe a ſingle acre planted every year after the expiration of 18 or 20, to cut annually 100*l.* a year from only 20 acres. which let, would yield but 8 *l.* a year. How beneficial a conduct.

It ſhould here be obſerved, that the larch is valued the ſame as the *Scotch* fir; but the beſt authorities tell us, the timber is one of the moſt uſeful known; probably, therefore, the value of it would turn out greater than the ſuppoſition in theſe experiments.

Experiment, No. 16.

Sixteen *Scotch* firs and two pinaſters raiſed from ſeed, ſown between *Michaelmas* 1732, and *Lady Day* 1733, were meaſured *June* 7, 1768. The meaſure is excluſive of the bark, for which 6 feet *per* load was allowed; the bark being very thick they were valued at 9*d.* a foot. They being full of ſap. The 306 feet come to 11*l.* 9*s.* 6*d.* The trees ſtand in a row at unequal diſtances; but are on an average at 15 feet.

No. 1.	*Scotch* fir	22 feet.
2.	Ditto.	13
3.	Ditto.	21
4.	Ditto.	26
5.	Ditto.	9
6.	Ditto.	22
7.	Ditto.	16
8.	Ditto.	10
9.	Ditto.	22
10.	Ditto.	18
11.	Ditto.	15
12.	Ditto.	22
13.	Ditto.	22
14.	Ditto.	8
15.	Ditto.	18
16.	Ditto.	16
		280

Brought over,	280 feet.
17. Pinaſter. ———	11
18. Ditto. ———	15
	306

A beech ſown at the ſame time, meaſured in *January* 21, 1769, 19 feet 7 inches.

Mr. *Fellowes* has had both the boughs and ſeed of the red deal from *Norway*, and he finds that it is the *Scotch* fir.

In a regular planting and cutting down a given quantity of land, it would be adviſable, I ſhould apprehend, to plant the old land again, which would ſave grubbing up the ſtumps and roots, which in rotting would turn to a rich manure for the new trees.

Plane trees Mr. *Fellowes* has planted; and he finds them to thrive amazingly in low moiſt ſituations. It will in ſuch, grow much faſter than the poplar. One he has of 30 years growth that will cut into planks 20 inches broad; but ſo vaſt a ſize he attributes in ſome meaſure to its ſtanding on the edge of a ditch through which the drainings of a farmer's pigſties run. Poplars, in ſome parts of the kingdom, are planted in low ſituations to the excluſion of every thing elſe: it is of conſequence therefore to know that the plane will do better; and in beauty it infinitely exceeds that ragged, crooked, unſightly tree, the poplar.

Mr. *Fellowes* in general recommends the larch as preferable to every other tree that he has tried; and which will pay a planter much greater profit than any of the reſt. As to the method of cultivating them, or any firs, he is of opinion that the land ſhould be cropped with turnips, and the trees ſet about the 10th of *April* following: but if that ſeaſon is omitted, late in *Auguſt* will do. They ſhould be 2 years old, and ſet at 4 feet ſquare. For four years it will be adviſable to hand-hoe the land about them twice a year, which will coſt 3 *s.* each hoeing: after that there will be no further expence *

——— *Gooch*, Eſq; of *Shotteſham*, has cultivated lucerne with ſucceſs: He has kept two horſes through a ſummer on the produce of only a rood of good land.

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* Mr. *Fellowes* in the corner of one of his fields has a ruſtic temple of a deſign which cannot but pleaſe. It is the imitation of a round hay-ſtack, thatched from the ground. I do not remember ſeeing one before. It is a ſtroke of pure taſte.

Suppoſe the ſummer 26 weeks,
and the horſes at 2 *s* 0 *d.*;
this amounts to *per* acre £.26 0 0

Lucerne is a plant that will ever be found to anſwer in an uncommon manner on good ſoils.

From this part of *Norfolk* I took the road to *Yarmouth* through the hundred of *Flegg*; which I had been told was cultivated in a moſt complete manner.

Farms in this country riſe from 50 *l.* to 500 *l.* a year; but are in general about 120 *l.* The ſoil is various, but chiefly a fine, mixed, dark good loam; lets at 15 *s.* an acre. Their courſes of crops moſt common, are,

1. Turnips
2. Barley
3. Clover
4. Wheat
5. Barley.

Alſo,

1. Turnips
2. Barley
3. Clover and ray-graſs for 2 years
4. Buck-wheat or peaſe
5. Wheat.

This is an excellent courſe. They plough but once for wheat; ſow 3 buſhels, and gain 3½ quarters an acre. For barley they ſtir thrice, ſow 3 buſhels, and reckon the average produce 4 quarters. They get 5 quarters of oats, and 10 have been known. For peaſe they plough but once; ſow 3 buſhels, and get 2 ½ quarters *per* acre.

They give four or five earths for turnips; hoe them always twice. Many are drawn for the fattening of beaſts, ſome in ſheds, ſome in bings in the farm yards, and ſome on dry graſs fields; but they reckon them to fatten beſt and quickeſt in ſheds; but one evil is, they wont drive ſo well in this method. They buy at the *Michaelmas* fairs both home bred and *Scotch* beaſts, almoſt lean; they put them to turnips, and ſell in *April.* If they buy at 5 *l.* they will ſell at 8 *l.* 8 *s.* or 9 *l.* They give no hay with the turnips; or a very trifle, but they have ſtraw at command. Three rood of turnips will fatten a beaſt of 45 ſtone, or 6 *Norfolk* wether ſheep.

The clover crop is both mown once—twice—and alſo fed wholly. Theſe variations depend on the wants of the farmer; but it is generally agreed among them, that the wheat which follows the crops cut for hay, are better than thoſe which ſucceed the crops fed. Tares are cultivated by ſome farmers for ſoiling their horſes with green in the ſtable; all for ſeed; and they ſow wheat after them.

In their manuring they are very good and attentive farmers. They chop their ſtubbles for littering; and their hay they ſtack all at home. Marle is uſed at a very great expence. It is brought from *Norwich* by water to *Yarmouth*, and from thence, by many farmers, to *Ormſby*, &c. from 4 to 7 and 8 miles by land. The expence is 3*l.* for a keel load of 18 cart loads, each 1 ½ tons, and the land carriage is 4*s.* a load more; ſo that the whole price is 7*s.* 4*d.* *per* cart-load. The greatneſs of this expence prevents their laying on ſuch large quantities as in other parts of *Norfolk.* Clay they likewiſe uſe; lay 40 loads an acre, and find it laſts 20 years. They make compoſts of clay or mould, farm-yard dung, and ſea ſand; covering the whole heap with the latter; but in one circumſtance they are very deficient, they never mix them by turning over.

Malt-duſt they ſow on clover, and find great benefit; about 4 quarters an acre.—*Yarmouth* dung they buy at 2 *s.* a load.

They have ſcarcely any meadow or paſture in the country; their cows they feed on clover and ray-graſs; an acre of which they reckon ſufficient for the ſummer food of one. Good cows give 5 gallons of milk a day. They let their dairies at 4 *l.* 4 *s.*; and reckon that the hirers make 1 *l.* 1 *s.* to 1 *l.* 11 *s.* 6 *d.* a head profit.

Swine fatten to 15 ſtone a head.

The number of ſheep kept is very ſmall; many farmers none at all; but thoſe that do, buy chiefly wethers and year old lambs, and ſell them fat within the year.

In their tillage, they reckon that 6 horſes are neceſſary to 100 acres of arable land: they uſe 2 in a plough; and do an acre and half a day in general; but 2 acres in barley ſowing; do not cut deeper than 4 inches on account of a poor barren ſand below the ſurface, which is pernicious to their land. The price *per* acre 2 *s.* 6 *d.* The annual expence *per* horſe they reckon at 6 *l.* Their ſtubbles they begin to break up for a fallow about *Chriſtmas.* They uſe none but wheel ploughs; which they reckon much the eaſieſt and moſt expeditious:

ous: but if they want to plough up a very ſtubborn piece of land— to cut deeper than ordinary, they uſe ſwing ploughs.

In the ſtocking farms they reckon 1500*l.* neceſſary for one of 300*l.* a year.

Land ſells at 26 or 27 years purchaſe.—

Tythes are compounded in all ſorts of ways, but the general rule is 3 *s.* an acre.

Poor rates 1 *s.*: Twenty years ago they were but 3 *d.*: the employment of the women and children ſpinning wool: all drink tea; and ſome thrice a day.

The following are the particulars of a farm.

350	Acres in all	4	Men
300	Arable	1	Boy
50	Marſh	2	Maids
£.260	Rent	5	Labourers
17	Horſes	60	Acres turnips
20	Cows	60	Wheat
40	Young	120	Barley
50	Fatting beaſts on turnips	60	Clover.

They have throughout this country a machine which I have not ſeen any where elſe, which is a cart convertible into a waggon by adding at pleaſure two fore wheels.

The farmers very ſenſibly remarked the danger that the filler horſe is always in when a two wheeled cart is heavy loaded, either of being lifted up by loading too heavy behind, or having his back broken by a load too heavy before:——carts in harveſt are of but little uſe from the danger of loading them freely on this account. Theſe motives induced them to contrive this addition, which they have to many of their carts in harveſt, rendering them as uſeful as waggons: They alſo uſe them on the road for carrying corn to market; they load them with 10 or 12 quarters of barley with the utmoſt eaſe, which is near as much as a waggon will carry: on the other hand, the fore carriage takes off with the greateſt eaſe, and then the cart is ready for marle, dung, earth, &c.

Plate VII. Fig. 1. and 2. is a repreſentation of one of them.

John Ramey, Eſq; of *Ormſby* near *Yarmouth*, has executed ſome experiments in huſbandry which deſerve being known. Lucerne he tried in compariſon with common huſbandry. In 1763, he threw a cloſe of 7 acres and an half of fine rich light

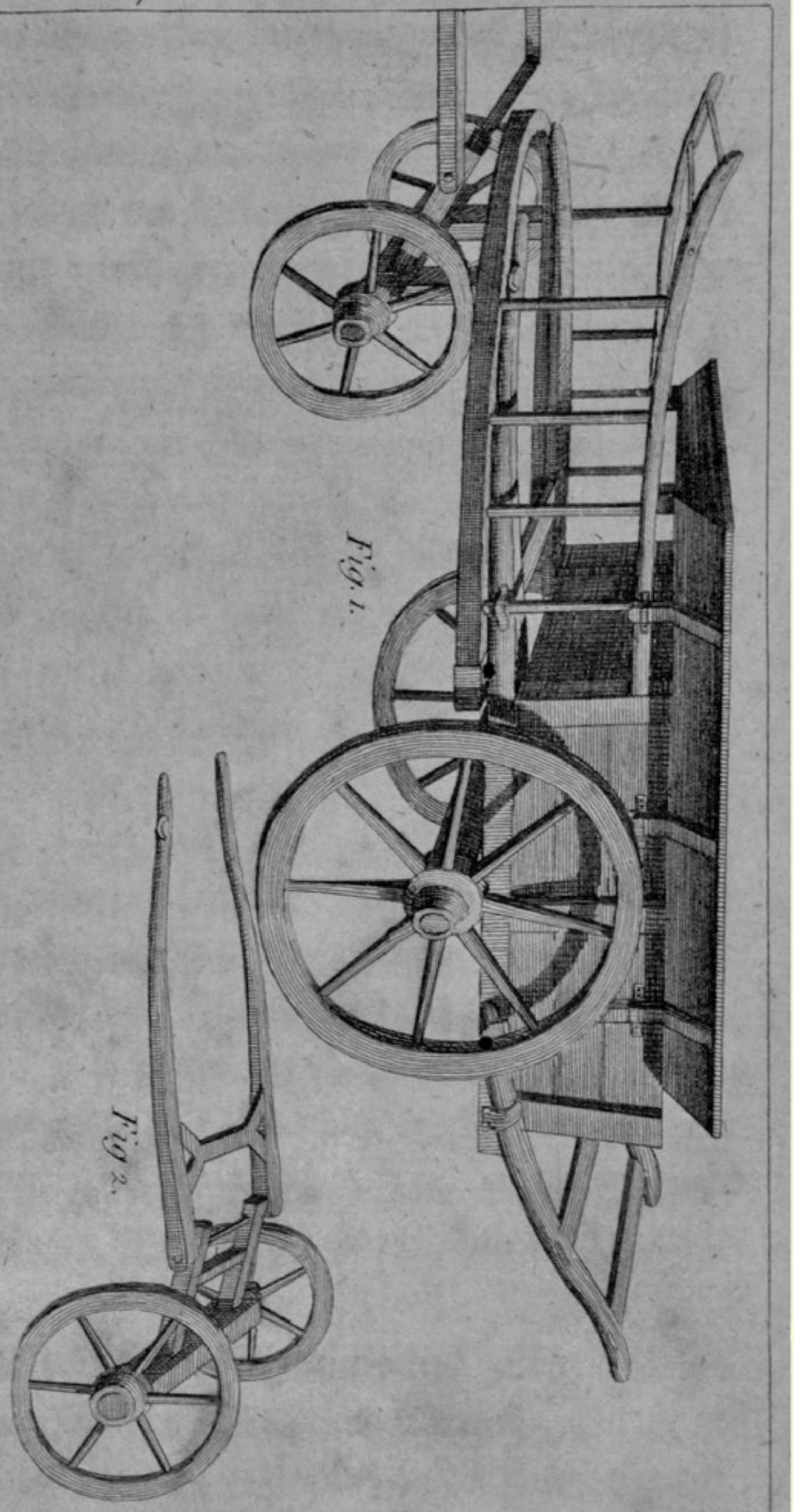

Fig. 1.

Fig 2.

light land into three diviſions; one of 3 acres of lucerne tranſplanted, one of half an acre of lucerne broad-caſt; and one of three acres for common huſbandry. The whole piece turnips in 1762, manured for. The three acres deſigned for tranſplanted lucerne were cropped in 1763, with *Charlton* peaſe, which were off the land time enough to give it three ploughings, and harrowings ſufficient to make it perfectly fine; and the lucerne was in *Auguſt* ſet in rows 3 feet aſunder, by 1 foot from plant to plant in the rows. It was kept clean of weeds by hand-hoeing, but came that autumn to nothing.

At the ſame time that the peaſe were ſown on that piece, barley was ſown on the other 3 ½ acres, broad-caſt lucerne on the half acre, and clover on the 3. The barley yielded 5 quarters *per* acre, which quite deſtroyed the lucerne, but did no damage to the clover.

1764.

This year the tranſplanted lucerne was cut three times; it was horſe-hoed four times, and hand-hoed thrice, at a great expence. But the product was ſmall, not

more

more than the three acres keeping two horſes through the ſummer.

The clover was cut twice; the firſt time it yielded 35 *C. wt. per* acre of hay; the ſecond 20 *C. wt.*

1765.

This year the lucerne was horſe-hoed three times, and hand-hoed as often; it was cut thrice, and given to the horſes in the ſtable: the product was ſomething better than the preceding year, but not to the amount of keeping another horſe.

The clover land was ploughed up, and yielded 3 ½ quarters of wheat *per* acre.

1766.

This year the lucerne declined; which Mr. *Ramey* perceiving, he did not attend to keeping it clean, ſo the weeds got the better of it.

The clover land, wheat ſtubble, was ſown with barley; the produce 4 quarters *per* acre.

In this trial the common huſbandry was beyond compariſon more advantageous than lucerne; but in extenuation of the ill ſucceſs of the latter, I muſt be allowed to obſerve that it was given up juſt when it was coming to perfection. For 3 acres of tranſplanted lucerne to keep 2 horſes the *firſt year*, is extraordinary, and bid fair for great things. The ſecond year it improved. There cannot be a moment's doubt of that improvement going on till it maintained 3 horſes *per* acre at leaſt: but all this depends on its being kept as clean as a garden. Mr. *Ramey*, diſguſted at the vaſt ſuperiority of the common huſbandry during two years, might not ſufficiently conſider that the 2 firſt of tranſplanted lucerne are but preparatory: Certainly, if a compariſon is not conducted for ſome time after a plant arrives at maturity, the concluſions drawn from it will not be deciſive.

Mr. *Ramey* has this year a crop of the great *Scotch* cabbage. The field was under barley laſt year; it was winter fallowed, and the plants ſet the laſt week in *May* in rows 3 feet aſunder, by 2 from plant to plant. The ſeed was ſown the third week in *March*. The tranſplantation was performed by women only; 2 ½ acres took one day of 6 women, and one day of 4, all at 8 *d*. a day; the coſt therefore 6 *s*. 8 *d*.

which is 2 *s.* 8 *d.* an acre. This is doing it very cheap, for 3 feet rows are cloſer than uſual; from whence it is very evident, that the tranſplanting ſhould always be done by women. None of the plants were watered: they have been horſe-hoed twice, and hand-hoed as often Mr. *Ramey* deſigns them for late ſpring feed, and has very judiciouſly ſown an adjoining 2 ½ acres with turnips; the whole field equally manured. This will enable him to judge which plant is the moſt profitable.

The following is Mr. *Ramey*'s common huſbandry.

1. Turnips, worth 3 *l.* an acre,
2. Barley, yields 4 quarters.
3. Clover, 3 loads of hay at 2 mowings.
4. Wheat, 3 ½ quarters.
5. Barley, 4 quarters.

This barley being as good as the crop after turnips is ſurprizing. He always manures for his turnips; the firſt hoeing he gives with a machine, in which 7 ſhares cut up the turnips in ſtripes; this he finds cuts the land deeper than the hand-hoe and though irregularly, yet the ſecond hoeing in the common manner, leaves the crop perfectly even.

In the application of his clover crop, this gentleman puts it to one uſe that deſerves great attention. He begins the ſecond week in *May* to ſoil 20 horſes with clover in the ſtable, and continues it till the wheat ſtubbles are ready to turn into: 7 acres feed 20 horſes and 7 cows; the latter in a houſe, or rack yard, but drove twice a day to water:—alſo 5 calves—and as many pigs. The horſes have neither corn nor hay.

Reſpecting the value of the crop, Mr. *Ramey* could not have his horſes ſo kept under 8 *d.* a day; but as the joiſting price of the country is 2 *s.* 6 *d.* a week, I ſhall calculate from that.

20 Horſes 17 weeks, at 2 *s.* 6 *d.* - -	£.42	10	0
7 Cows ditto, at 2 *s.* 6 *d.* -	14	17	6
5 Calves ditto, at 1 *s.* 6 *d.* -	6	7	6
5 Pigs ditto, -	0	0	0
	63	15	0
Or *per* acre, - -	9	2	1

This is one of the moſt curious experiments I have met with; for though it is a practice that has been often recommended, yet I never met with an accurate account of what a given quantity would do. It is from hence clearly evident, that this method of uſing clover is by far the moſt beneficial: the quantity of dung raiſed, where there is litter at command, is immenſe; much more than in winter, from the cattle making ſo much more urine when fed on green food. I ſhould value this article at 4 or 500 loads of manure from the above cattle, at 2 *s.* 6 *d.* a load.

But a ſtrong confirmation of the preceding valuation, is the conſumption of clover by a tenant of Mr. *Ramey*'s, who fed the very ſame ſtock (in number) in the field. Mr. *Ramey* watched it minutely, and when he had eaten 5 acres, this man's ſtock had conſumed 30 acres, and his horſes were not in ſuch good condition. Thus does one acre of clover *mown*, go exactly as far as 6 *fed* *

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* In Mr. *Ramey*'s houſe on *Yarmouth Quay*, he has furniſhed a parlour with drawings of Mrs. *Ramey*'s execution with a hot poker: there are ſeveral pieces of ruins after *Panini*, *Giſolphi*, &c. a *Dutch* ſkating piece, and ſome landſcapes.

The neatneſs and minute accuracy with which they are done are wonderful. There is frequently a ſpirit in the ſtrokes ſuperior to the original prints. After you have viewed *Yarmouth Quay*, which is one of the fineſt in *England*, you will find nothing in the place ſo much worth ſeeing as theſe very elegant performances.

LETTER XIV.

AS I ſhall preſently leave *Norfolk*, it will not be improper to give a ſlight review of the huſbandry which has rendered the name of this county ſo famous in the farming world. Pointing out the practices which have ſucceeded ſo nobly here, may perhaps be of ſome uſe to other countries poſſeſſed of the ſame advantages, but unknowing in the art to uſe them.

From 40 to 60 years ago, all the northern and weſtern, and a part of the eaſtern tracts of the county, were ſheep-walks, let ſo low as from 6*d.* to 1*s.* 6*d.* and 2*s.* an acre. Much of it was in this condition only 30 years ago. The great improvements have been made by means of the following circumſtances.

FIRST. By incloſing without aſſiſtance of parliament.

SECOND. By a ſpirited uſe of marle and clay.

THIRD. By the introduction of an excellent courſe of crops.

FOURTH. By the culture of turnips well hand-hoed.

FIFTH. By the culture of clover and ray-graſs.

SIXTH. By landlords granting long leaſes.

SEVENTH. By the country being divided chiefly into large farms.

In this recapitulation, I have inſerted no article that is included in another. Take any one from the ſeven, and the improvement of *Norfolk* would never have exiſted. The importance of them all will appear ſufficiently evident from a ſhort examination.

THE INCLOSURE.

Provided open lands are incloſed, it is not of very great conſequence by what means it was effected; but the fact is, that parliamentary incloſures are ſcarcely ever ſo complete and general as in *Norfolk*; and how ſhould they, when numbers are to agree to the ſame meaſure? Had the incloſure of this county been by acts of parliament, much *might have been* done, but on no compariſon with what *is* done. The great difficulty and attention *then* would have been to incloſe: *Now* the works of improvement enjoy the immediate attention. And undoubtedly many of the fineſt loams on the richeſt marles would at this day have been ſheep-walks, had there been any right of commonage on them. A parliamentary incloſure is alſo (through the knavery of commiſſioners and attorneys) ſo very expenſive, compared with a private one, that it would have damped the ſucceeding undertakings; in taking too large a portion of the money requiſite for the great work, in a mere preparation for it.

Theſe circumſtances are to be ſeen more or leſs in moſt of the countries incloſed by parliament.

MARLING.

It is the great felicity of the ſandy part of this county, that dig where you will, you find an exceeding fine marle, or clay. The marle is generally white, with veins of yellow, and red; ſometimes only tinged with thoſe colours. If dropped in fair water, it falls, and bubbles to the top; if it is very good, it has an effervеſcence. All efferveſce ſtrongly in vinegar, if dropt in it in a lump, and ſome will at once make the glaſs, though but half full, boil over in a froth. But moſt will do this if the marle is powdered before it is put in. The clay has none of theſe qualities. The beſt marle is that which falls the quickeſt in water, for ſuch will always have the greateſt efferveſcence in acids.

It is common in this county to hear of the *ſalts* of marle. As well as they underſtand the uſe of it, they know little of its nature; no ſalts are to be extracted from marle: though a little oil is to be gained. It may produce ſalt when ſpread on the land, by its abſorbent and alkaline quality, attracting the vitriolic acid, and converting it into a neutral ſalt; and this quality is probably one of its greateſt advantages. It likewiſe not only attracts oil from the air, but diſſolves, and fits it for the purpoſes of vegetation.

I have not met with any perſons that have been curious enough to form a ſeries of ſmall experiments on marle, for the diſcovery of the proper *quantities* for uſe, in proportion to the given *qualities* of it.

The farmers, on the firſt uſe of marle,

ſpread it in larger quantities than others have done ſince: 100 loads were common, and few uſed leſs than 80. But land is now marled for the firſt time in ſome places with not more than from 40 to 60 loads. The reaſon given me for this change was principally a view to future marlings: if 80 or 100 are laid on at firſt, they do not think a repetition of 20 or 30, at the end of 20 or 25 years, will anſwer ſo well as if the firſt quantity had been ſmaller.

It is yet an opinion among ſome farmers that their land will not pay for a ſecond marling. But the beſt huſbandmen in the county are clearly of a different way of thinking. When the firſt manuring is wearing out pretty faſt, which generally happens in about 20 years, they (on the renewal of their leaſe) repleniſh the ground with an addition of from 20 to 35 loads an acre more. And ſeveral tracts of country have been marled with ſucceſs for the third time.

But it is not the marle or clay alone that has worked the great effects we have ſeen in *Norfolk*. It muſt be ſpread on a ſuitable ſoil: this is a light *ſandy loam*, or *loamy* *ſand*; not a ſand. In ſome places a *gravelly loam*; but not a gravel. What they call their *woodcock* loams are free from gravel, and rather ſo from ſand; they are more inclinable to a dry friable clay, but at the ſame time ſound and dry enough for turnips.

Theſe are their beſt ſoils.

Some tracts of pure ſand have been marled, and with ſucceſs, though not ſo great: but clay, from its ſuperior tenacity, is reckoned better for them than marle.

The reader is not to ſuppoſe that the *Norfolk* men have depended on theſe manures alone; on the contrary, they have been very attentive to others. Folding ſheep, through both winter and ſummer, is no where more practiſed, or better underſtood. Winter fatting beaſts on turnips in the farm-yards; confining the cows to thoſe yards; and keeping in them very large ſtocks of ſwine, convert their plenty of ſtraw into manure; which they make good uſe of. Oil cake they lay on their wheat, at an expence of 40 *s.* or two guineas an acre. All theſe manures they uſe to far greater profit than if their land had not been marled.—That foundation of their huſbandry is a preparative for all ſucceſſive manurings; they take the greater effect from following an abſorbent earth, and laſt (it is aſſerted) the longer: but that I ſhould doubt.

THE COURSE OF CROPS.

After the beſt managed incloſure, and the moſt ſpirited conduct in marling, ſtill the whole ſucceſs of the undertaking depends on this point: No fortune will be made in *Norfolk* by farming, unleſs a judicious courſe of crops be purſued. That which has been chiefly adopted by the *Norfolk* farmers is,

1. Turnips
2. Barley
3. Clover; or clover and ray-graſs
4. Wheat.

Some of them, depending on their ſoils being richer than their neighbours (for inſtance, all the way from *Holt* by *Aylſham* down through the *Flegg* hundreds) will ſteal a crop of peaſe or barley after the wheat; but it is bad huſbandry, and has not been followed by thoſe men who have made fortunes. In the above courſe, the turnips are (if poſſible) manured for; and much of the wheat the ſame. This is a noble ſyſtem, which keeps the ſoil rich; only one exhauſting crop is taken to a cleanſing and ameliorating one. The land cannot poſſibly in ſuch management be either poor or foul.

The only variations are in the duration of the clover; which extends from one year to three or four. On the firſt improvement, ray-graſs was generally ſown with it, and it was left on the ground 3 or four years: but latterly they ſow no more ray-graſs than merely ſufficient for their flocks, and leave it 2 years on the ground. The reſt of their clover crop is ſown alone, and left but one year. Opinions are not clear on theſe variations. Some think the modern method an improvement; others, that the old one was better.

If I may be allowed to hazard an idea on this point, I ſhould venture to condemn the ploughing up the clover the firſt year; and for theſe reaſons. It is exhauſting the land more: Two crops of corn in four years, exhauſt much more than two in five years: hence appears to me the *modern* neceſſity of buying oil cake at two guineas an acre. The marle is loſt ſooner in this method, for that ſubſides in exact proportion to the quantity of tillage in a given time. It does not ſink while the land is at reſt; but while it is pulverizing by the plough. Laſtly, the ſtock of cattle is leſs, conſequently the quantity of dung inferior; inſtead of folding 25 acres, only 20 are done. They do not pretend that the wheat after a lay of *two* years is worſe than after that of *one*——but they ſay it is not ſo clean. I admit that there will be more trouble in clearing the turnip fallow of twitch; but let that trouble be carried to account, and it will not balance the counter advantages.

Beſides, the beſt farmers agree, that if the turnip fallow is well executed; the plants twice well hoed, and the land ſtirred thrice for barley; that, then the clover lying 2 years, will not give a foul crop of wheat. Twitch generally comes from ſome neglect.

TURNIPS.

Every link of the chain of *Norfolk* huſbandry has ſo intimate a connection and dependance, that the deſtruction of a ſingle one, ruins the whole. Every thing depends not only on turnips, but on turnips well hoed; an aſſertion that will receive but little credit in various parts of the kingdom. Turnips on well manured land, thoroughly hoed, are the only fallow in the *Norfolk* courſe; it is therefore abſolutely neceſſary to make it as complete as poſſible. They cannot be changed for a mere fallow, becauſe the ſtock of ſheep kept for folding, and eating of the clover and ray-graſs; and farm-yard cattle would then all ſtarve; and add to this, that the tillage during the latter part of the ſummer, &c. which muſt be ſubſtituted inſtead of them, would pulverize the ſands too much, which are greatly improved by the treading of the cattle that eat the crop off. In a word, the improved culture of this plant is ſo important to the *Norfolk* huſbandry, that no other vegetable could be ſubſtituted that a common farmer would cultivate.

CLOVER AND RAY-GRASS.

This alſo is another article that could not poſſibly be diſpenſed with. The light parts of the county have neither meadows nor paſtures; their flocks of ſheep, dairies of cows, their fatting beaſts in the ſpring, and their horſes all depend on theſe graſſes, and could ſubſiſt by nothing elſe; nor could they raiſe any wheat without this aſſiſtance. Their ſoil is too light for that grain before it is well bound and matted together by the roots of the clover, which are at the ſame time a rich manure for the wheat: a fallow inſtead of clover would be worſe than nothing, it would render the land much too light. For theſe reaſons, which certainly are deciſive, nothing could be done here without clover.

LEASES.

It is a cuſtom growing pretty common in ſeveral parts of the kingdom, to grant no leaſes: this will do very well where no improvements are carried on; where a tenant can never loſe any thing by being turned out of his farm: but it is abſurdity itſelf to expect that a man will begin his huſbandry on your land by expending 3, 4, or 5*l.* an acre, while he is liable to be turned out at a year's notice. I ſhall not take up more of your time on a point which is ſelf-evident. Had the *Norfolk* landlords conducted themſelves on ſuch narrow principles, their eſtates, which are raiſed five, ſix, and tenfold, would yet have been ſheep-walks.

LARGE FARMS.

If the preceding articles are properly reviewed, it will at once be apparent that no ſmall farmers could effect ſuch great things as have been done in *Norfolk*. Incloſing, marling, and keeping a flock of ſheep large enough for folding, belong abſolutely and excluſively to great farmers. None of them could be effected by ſmall ones—or ſuch as are called middling ones in other countries. —Nor ſhould it be forgotten, that the beſt huſbandry in *Norfolk* is that of the largeſt farmers. You muſt go to a *Curtis*, a *Mallet*, a *Barton*, a *Glover*, a *Carr*, to ſee *Norfolk* huſbandry. You will not among them find the ſtolen crops that are too often met with among the little occupiers of an hundred a year, in the eaſtern part of the county. Great farms have been the ſoul of the *Norfolk* culture: ſplit them into tenures of an hundred pounds a year, you will find nothing but beggars and weeds in the whole county. The rich man keeps his land rich and clean.

Theſe are the principles of *Norfolk* huſbandry, which have advanced the agriculture of the greateſt part of that county to a much greater height than is any where to be met with over an equal extent of country. I ſhall in the next place venture ſlightly to mention a few particulars in which the *Norfolk* farmers are deficient.

1. Peaſe are never hand-hoed.
2. Wheat, though weedy, the ſame.
3. Beans, the ſame every where, except in marſhland.
4. No regular chopping of ſtubbles for littering the farm-yards: it is very incompletely practiſed.
5. Meadows and natural paſtures managed in as ſlovenly a manner as in any part of the kingdom.
6. The breed of ſheep contemptible.
7. That of horſes very indifferent.
8. Vaſt tracts of land admirably fit for

carrots; but none cultivated except a very few near *Norwich*.

9. All their hedges managed on the old ſad ſyſtem of cutting off live wood, and ſupplying the place with dead: no plaſhing.

These circumſtances, however, are by no means a balance to the merit of the good huſbandry before ſtated; I hint them only as matters deſerving the attention of farmers, who have ſhewn in general ſuch enlightened views.

I am, Sir, &c.

LETTER XV.

FROM *Yarmouth* to *Beccles* the country is various, but in general cultivated pretty well; rents riſe from 9*s.* to 16*s.*—The latter mentioned town is clean, well built, paved, and prettily ſituated by a river. Four miles ſouth of it, land lets on an average at 12*s.* an acre. I obſerved ſeveral fields that ſeemed new laid to graſs, and extremely well done; and having ſeveral times heard of *Suffolk* being famous for graſs ſeeds, I made enquiries concerning them. They lay down with 3*lb.* of trefoile *per* acre, 1 ½ *lb.* of white clover, and 5 ſacks of hay ſeeds, which they gain by ſhaking the hay off clean upland meadows of a rich ſoil, with forks in winter before they uſe it. And then they dreſs them with great care. They aſſured me, that they get the ſeeds quite clean and free from weeds. An acre of hay yields 3 or 4 ſacks of 3 buſhels; and they ſell in proportion to the goodneſs, from 2*s.* 6*d.* to 4*s.* a ſack. Very fine ſeeds they reckon to grow about *Laxfield*, *Baddingham*, *Freſſingfield*, *Ottley*, and *Helmingham*. When they lay down, they always ſow with ſpring corn: mow it the firſt year, and get a load and half of hay an acre.

Their products of corn are as follow:

Wheat, 2 quarters.
Barley, 2 ½ quarters.
Oats, 4 quarters.
Beans, 4 quarters.
Turnips, worth 30 *s.*

Clover, 2 loads of hay, at 2 mowings. But they inſiſt that the land is tired of clover; it comes up thick and fine, but is all eaten off in *February* by a red worm, which did not uſe to happen to them.

They uſe only wheel ploughs, and but 2 horſes.

In ſeveral parts of this country, particularly towards *Hoxton*, and *Rumburgh*, there are very great dairies kept; up to 40, 60, and 70 cows, which they uſe all for butter and cheeſe; their cows give from 2 to 8 gallons of milk a day; the breed, all the little *Suffolk* mongrel. One of them will eat 2 acres of graſs in ſummer, and if ſhe has nothing elſe, a ton and half of hay in winter. They calculate the product from 4 *l.* to 5 *l.* each; but many dairies are let at 3 *l.* 5 *s.* a head. They reckon that each cow maintains a hog. The attendance upon them is in proportion to 3 dairymaids and one boy to 40 cows.

On a farm of 250 *l.* a year, they often keep 60 cows. And they reckon 3000 *l.* neceſſary to ſtock a dairy one of 300 *l.* a year.

Farms in general, riſe from 100 *l.* to 300 *l.* a year.

From *Beccles* to *Yoxford*, I obſerved little patches of hemp in the gardens of moſt of the cottagers, which is an inſtance of induſtry much to their honour.

At *Yoxford* I obſerved, for the firſt time, ſwing ploughs chiefly uſed. The farmers here think quite contrary to thoſe throughout *Norfolk*.

Towards *Saxmundham*, and about that place, the ſoil is all ſandy. Two miles on the other ſide of it, towards *Woodbridge*, I remarked exceeding good crops. Rents riſe from 6 *s.* to 17 *s.* but on an average are

14*s.* Farms, from 100*l.* to 500*l.* a year. Their crops; Wheat, 2 ½ or 3 quarters; Barley, 4; Oats, 4; Peaſe 3 quarters, all hand-hoed; Beans, 4 or 5 quarters, all hand-hoed twice, and many in drills. Let me here remark, that I have no where elſe found very light ſands ſo rich as to be commonly cropped with beans, as theſe are; an inſtance of richneſs that is great. It proves that the opinion of beans requiring a great tenacity in the ſoil is quite falſe; for I ran a cane 2 feet deep in many fields here with eaſe.

They cultivate ſome carrots, but not ſo many as nearer to *Woodbridge*; but they are greatly to blame, for when they do ſow that root, they get 5 buſhels *per* ſquare rod, which are 800 *per* acre; and at 1*s.* come to 40*l.* They give them to their horſes inſtead of oats, and alſo fatten hogs on them.

For ſome miles further the land continued the ſame, a rich ſand; the courſe,

1. Turnips
2. Barley
3. Clover, one year
4. Wheat.

Their turnips are worth about 30*s.* on an average, and the clover yields from 1 to 2 loads of hay at a cutting. But they have ſome tracts of poor ſands which are not good enough for the above courſe; they will not yield turnips without dung; ſo are fallowed for oats, with the oats, clover, and ray-graſs for 3 years, as a ſheep-walk, then break it up for oats again; and after them fallow as before: where turnips *cannot be had*, this it muſt be confeſſed is not a bad courſe.

But the famous huſbandry of this country is near *Woodbridge*; particularly in the ſpace of country comprehended in the pariſhes of *Eyke*, *Wanteſden*, *Bromeſwell*, *Sutton*, *Shottiſham*, *Ramſholt*, *Alderton*, and *Bawdſey* through which country I have paſſed with pleaſure; the ſands about *Capel St. Andrews* are poorer—they form one farm of near 4000 acres. The former places lie pretty much together, forming a retired corner of the world, ſcarcely ever viſited by travellers, and yet abounding in ſeveral inſtances with the beſt huſbandry in *Britain*. In many particulars, it will ſurprize a ſtranger more than any thing to be ſeen in *Norfolk*.

Farms are of various ſizes, from 100 *l.*

to 500*l.* a year; and the rents of two ſorts: the poor ſheep-walk ſands, run at 4*s.* or 5*s.* an acre; but the better kind from 14*s.* to 20*s.*; in general about 16*s.*

Their courſes on the good ſands, are,

1. Carrots
2. Turnips
3. Barley
4. Beans
5. Wheat.

This is an excellent one.

1. Turnips
2. Barley
3. Clover
4. Wheat
5. Beans
6. Barley.

Another admirable courſe.

At other times, they drop the 5th and 6th crops; ſtopping at the fourth. Peaſe are ſometimes uſed inſtead of the beans; and at others added after the barley as a 7th crop. It is an univerſal rule with them never to let wheat, barley, or oats, come twice together, and they adhere to it very ſtrictly.

They plough the clover land but once for wheat; but the bean ſtubbles twice or thrice, if wanting. If the crop happens to be weedy, they hand-hoe it. The average crop 4 quarters *per* acre.

They plough three times for barley, and

reckon the mean crop at 5 ½ quarters; it riſes very often to 6 or 7. When they ſow oats, they never get leſs than 5 quarters.

Of peaſe, their culture is extremely perfect; they plough from once to 3 times for them; generally drill them, and never omit keeping them clean by hand-hoeing; from one to 3 hoeings, as the weeds happen to ariſe: the average crop about 3 ½ quarters. Beans they are equally attentive to; they generally dibble them in rows equally diſtant, 16 or 18 inches aſunder. The ſetting coſts 3 *s.* 6 *d.* an acre. they never fail hand-hoeing twice, at the expence of 8 *s.* an acre. They uſe the horſe-bean, and alſo many *Windſor* ticks: Of the former ſort their crops riſe from 5 quarters to 7 ½ quarters; and this upon ſand!—Such are the effects of good culture! They get 4 or 5 quarters of the *Windſor* bean; and ſell them from 40 *s.* to 3 *l.* a quarter.—This huſbandry of peaſe and beans is no where exceeded.

They always hand-hoe their turnips twice, and feed them on the land with ſheep and cattle.

Carrots are a crop that do them honour.

They ſow them to chooſe on their rich deep ſand; I examined it particularly, and brought away about half a peck of it.—It is almoſt a running ſand, of a dark red colour, but has a principle of adheſion in it ſufficient to produce any thing; it cakes together without the leaſt baking or plaiſtering, ſo that a ſlight touch crumbles it. They plough the ſtubble but once for carrots, holding that better than giving any previous tillage.

About old *Lady Day* they trench plough with two ploughs in the ſame furrow, the firſt with three horſes, and the laſt with two; getting a foot depth: they then immediately harrow in the ſeed, without any manuring. I enquired particularly into the failures of the crop; they ſaid that if the ſeed was good, carrots never failed: when once they came up they were ſure. They never omit hand-hoeing them thrice, at the expence (the three times) of from 16*s.* to a guinea an acre. The hoe they uſe at firſt is not above 4 inches wide; but they leave them at laſt a foot aſunder.

They begin to take up about *Michaelmas*, with three pronged forks; and except having a ſmall ſtore before hand, in caſe of hard froſts, always take up as they are wanted. The carrot tops wither, and rot upon the land; but no froſts affect the roots. Leaving them in the ground renders it neceſſary to ſow turnips after.

As to the produce, I had in different places three accounts: Firſt, that they yielded from 3 to 6 buſhels on a ſquare rod; the average is 4 ½; or 720 buſhels on an acre. Secondly, that a crop generally gave 12 loads an acre, each 40 buſhels, beſides what is uſed at home; this was indefinite: the 12 loads come to 480 buſhels:—one man thought the crop was 15 loads, or 600 buſhels. Thirdly, I was informed that they came on an average to 1 *lb.* each, and ſtood over a whole field on a medium at 1 foot ſquare; this quantity, at 56 *lb.* the buſhel, is 776 buſhels. The faireſt way will be to take the average of the three accounts.

	Buſhels.
By the rod, - -	720
By the load, - -	600
By weight, - -	776

Average 698 buſhels.

They ſell at 6*d.* a buſhel: the crop therefore pays 17*l.* 9*s.* an acre. But I have already remarked that they are worth 1*s.* for fattening cattle.

They give large quantities to their horſes; after waſhing clean, they are cut into the chaff. They allow a buſhel *per* horſe *per* day, and give no corn at all—yet their horſes are conſtantly worked; but on carrots they will do as much work as on any food.

They likewiſe feed their hogs on them; and fatten many completely. No food does better for ſwine in general.

In their tillage they plough with but two horſes, and break up their ſtubbles at *Michaelmas*; at firſt ploughing they do only an acre a day, but afterwards 1 ½ or 2. They never keep their horſes in the ſtable of nights, but turn them looſe into the farm-yards. The breed of horſes peculiar to this country is one of the greateſt curioſities in it: I never yet ſaw any that are comparable to them in ſhape, or the amazing power they have in drawing. They are called the ſorrel breed; the colour a bay ſorrel. The form, that of a true round barrel, remarkably ſhort, and the legs the ſame; and lower over the forehand than in any part of the back; which they reckon here a point of conſequence. They ſell at ſurprizing rates; the good geldings or mares, at from 35 to 60 guineas each; and ſmaller ones, of 8, 9, or 10 years old, at 20*l*. But none of them are very large. The work they will do is extraordinary, being beyond compariſon ſtronger and hardier than any of the great black breeds of *Flanders*, *Northamptonſhire*, or *Yorkſhire*. They are all taught with very great care to draw in concert; and many farmers are ſo attentive to this point, that they have teams, every horſe of which will fall on his knees at the word of command twenty times running, in the full drawing attitude, and all at the ſame moment, but without exerting any ſtrength, till a variation in the word orders them to give all their ſtrength—and then they will carry out amazing weights.

It is common to draw team againſt team for high wagers.

I was aſſured by many people here, that four good horſes in a narrow wheeled waggon would, without any hurt or miſchief from over working, carry 30 ſacks of wheat, each 4 buſhels, (near 9 gallon meaſure) 30 miles, if proper fair time was given them. A waggon weighs about 25 *C. wt.* this weight therefore is very near 5 tons. And let me add, that they have not a turnpike near them. One might venture to aſſert, that there are not 4 great black horſes in *England* that would do this.

Another moſt uncommon circumſtance in the huſbandry of this country, is the uſe of a manure peculiar to them, which they call *crag*. It is found in almoſt all the hills and higher lands in the country, at various depths, ſometimes only 2 or 3 feet from the ſurface; and it lies in a deeper ſtratum than they find neceſſary to dig. It appears to be totally compoſed of ſhells crumbled into powder, many are found in it of their entire form, particularly muſcles. The colour of it, a mixture of white and red. I brought away half a buſhel; and have ſince tried it in ſtrong vinegar, but it has not the leaſt efferveſcence—nor any ebullition. And yet it undoubtedly enriches the ſoil far more than any marle;

for the farmers here lay on but 10 or 12 cart-loads an acre, and the effect is amazingly great, with this uncommon circumſtance, the ſoil is ever after greatly the better for it; nor do they, in 12 or 15 years, as is common with ſuch ſmall quantities of marle, find the benefit declining faſt. But there is a ſtrong notion among them, that the land can be cragged but once; if it is afterwards repeated, no advantage is found from it. This part of my intelligence I doubt very much; and eſpecially as they find it very advantageous to form compoſts of crag and dung; which they practiſe much: carting the dung to the crag pits, and there making the compoſt heaps, turning it over twice, and ſometimes thrice.

The redder the crag is, the better they reckon it.

The effect of it is ſo great, that in breaking up the poor heaths of this country, they have had a ſucceſſion of exceeding fine crops of all ſorts from ſuch parts as they have manured with it; while at the ſame time, other parts unmanured have ſcarcely yielded the ſeed again.—All the rich incloſures of this country have been cragged.

The farmers here are very attentive to all ſorts of manures. They raiſe large quantities of farm-yard dung, and cart it all on to heaps, and mix it either with crag or virgin mold; and this univerſally. They turn over and mix theſe heaps well together before they ſpread them on their land. They chop their ſtubbles; ſtack their hay at home, and fold their ſheep conſtantly.

Upon the whole, this corner of *Suffolk* is to be recommended for practiſing much better huſbandry, all things conſidered, than any other tract of country with which I am acquainted.

Their crag huſbandry, their culture of carrots, their breed of horſes, are circumſtances peculiar, no where elſe to be ſeen. Their management of the pea and bean crops, is much more maſterly than any thing met with in moſt parts of the kingdom. Their courſes of crops are unexceptionable:—in a word, they exert every effort of good huſbandry to command ſucceſs.—They enjoy it: and well deſerve the fruit of their labours.—That of *Norfolk* is juſtly famous; but every thing conſidered, it muſt undoubtedly yield to the more garden-like culture of this country:—their crops are far ſuperior to any thing in the neighbouring county.

Flanders has long been mentioned as the moſt perfectly cultivated country in *Europe*. What the ſoil is I know not; but I will venture to aſſert that,—ſoil equal, no *Flanders* huſbandry can exceed the above deſcribed.

From *Woodbridge* to *Ipſwich* the country is various; but much of it not cultivated ſo well as what I had paſſed. It lets from 10*s*. to 16*s*. *per* acre. I went from the latter named place to *Nacton*, purpoſely to view the houſe of Induſtry there. It is a large irregular building; the diſpoſition of the apartments does not ſeem very well contrived for convenience. The original ſum raiſed for the building and furniſhing it was 4800*l*.; the average of the laſt ſeven years rates over the hundred was taken, and produced 1475*l*. a year. They have generally from 120 to 200 poor in the houſe; at preſent 144. They earn upon an average 250*l*. a year, which makes the income of the houſe 1725*l.* a year. This has been conſiderable enough to enable the truſtees to pay off 1200*l.* of the debt; and it has been erected but 12 years.

It ſtands in an high airy ſituation: a healthy ſpot, and the whole appears to be kept in a very clean and wholſome manner. There are various apartments for men with their wives—for ſingle men and lads—and alſo for ſingle women and girls. For the ſick, &c. and a ſurgery. There are likewiſe proper rooms for the different manufactures carried on; ſuch as ſpinning, weaving, making twine, making ſacks, &c. &c. alſo offices for baking, brewing, &c. with proper ſtore rooms; and an apartment for the governor of the houſe, and for the truſtees to meet in: the whole open to the view of any perſon that comes to ſee them; and alſo all the proviſion with which the poor are fed. They are undoubtedly taken excellent care of, both ſick and well. The following is a table of their diet.

SUNDAY.

Breakfaſt. Bread, and cheeſe, and butter, and milk.

Dinner. Beef and dumplings. Pudding and mutton for the ſick.

Supper. Bread, and cheeſe, and butter, and milk are the ſupper every day in the week.

MONDAY.

Breakfaſt. Beef broth.

Dinner. Baked ſuet pudding.

TUESDAY.

Breakfaſt. Milk broth in winter; milk in ſummer.

Dinner. Beef and dumplings.

WEDNESDAY.

Breakfaſt. Beef broth.

Dinner. Rice-milk or broth, &c.

THURSDAY.

Breakfaſt. Milk in ſummer; milk broth in winter.

Dinner. Beef and dumplings.

FRIDAY and SATURDAY.

Breakfaſt. Meat broth.

Dinner. Bread and butter.

Peaſe porridge uſed to be the dinner on the two laſt days, but they petitioned for bread and butter inſtead of it, which found their favourite dinner, becauſe they have tea to it. I expreſſed ſurprize at this being allowed; but they ſaid they were permitted to ſpend 2 *d.* in the ſhilling of what they earned, as they pleaſe; and they laid it all out in tea and ſugar to drink with their bread and butter dinners.

Indulgence renders it neceſſary to let them do as they pleaſe with it, but it would be better expended in ſomething elſe.

Whatever they eat is perfectly good of the kind; the beſt wheat; none but good *Warwickſhire* cheeſe; the beſt beef; and every article the ſame: no neighbouring poor live near ſo well in their own cottages; and not one little farmer in ten. They are cloathed in a warm comfortable manner, and are in general pretty well ſatisfied with their ſituation; but the confinement diſguſts them; they are not allowed conſtant liberty without the yards (which indeed would be impoſſible) and this they diſlike.—A ſurgeon attends twice a week regularly; and oftener if neceſſary.

The grand points in the eſtabliſhment are, the poor being better taken care of than in the old parochial method; and at the ſame time a ſaving of 100*l.* a year made. Theſe two points are thoſe principally to be attended to, in any diſcuſſion of the merit of theſe eſtabliſhments; becauſe it is impoſſible they ſhould unite without exceedingly beneficial conſequences flowing from them. That the poor of all ſorts are taken the utmoſt care of, is a fact indiſputable, clear to the eyes of every ſtranger, as well as thoroughly known to every perſon in this neighbourhood.

There remains a debt of 3600*l.* which will all be paid off ſooner than may at firſt be imagined. If they paid off 100*l.* a year while they had the intereſt of 4800*l.* to diſcharge; now they have only the intereſt of 3600*l.* to pay, they conſequently liquidate 148*l.* a year, which in the next ten years will reduce the debt to 2120*l.* The ten years following, they will in the ſame proportion diſcharge 208*l.* a year, which will clear the remaining debt in eleven years. So that the ſum total will be paid off in 33 years from building the houſe.

Then (and not till then) they lower rates.

The total income is 1725 *l.* a year, which enabled them, after maintaining their poor, to pay 192 *l.* a year in intereſt, and 100 *l.* in diſcharge of debt, in all 292 *l.* a year. They receive from the pariſhes in rates 1475 *l.* a year; conſequently they can then immediately ſink this ſum 292 *l.* which reduces it to 1183 *l.*——which reduction amounts to *a fifth*.—And this ſeems the ultimate degree of benefit, in reſpect of lowering rates; and a matter of importance it is, when we conſider that it is gained by the ſame meaſure, which adds ſo much to the advantage of the poor.

But there are four or five other houſes of Induſtry in this county, and one in *Norfolk*; ſome of which I find have made vaſtly greater ſavings, even to the diſcharging more than half their debt in 10 or 12 years; ſuch houſes will in the end, and ſpeedily too, ſink the rates much more conſiderably.

Boſmere and *Claydon* hundreds have one of only 5 years ſtanding. They borrowed 10,000 *l.*; the rates amount to 2526 *l.* annually, and the earnings 400 *l.* a year. Total income 2926 *l.* In theſe five years

they have paid off 1400 *l.* which has reduced the debt to - -		£.8600
In 5 years more they will pay off the ſame,	£.1400	
Alſo the deduction of intereſt,	280	
		1680
The debt will therefore in 10 years, from the firſt eſtabliſhment, be reduced to - - -		6920
In 5 years more the ſame payment will be made,	1400	
Alſo deduction from intereſt,	620	
		2020
The debt in 15 years, from firſt eſtabliſhment, will be reduced to,		4900
In 5 years more, -	1400	
Deduction from intereſt,	1020	
		2420
In 20 years, reduced to - -		2480
In 5 years more	1400	
Alſo the deduction of intereſt,	1500	
		2900

In 25 years the whole debt paid. And as they paid at firſt 400 *l.* a year in intereſt, and 280 *l.* in diſcharge of debt, together

680*l.* a year; the proportion of that ſum to 2926 *l.* is the proportion in which the rates will be lowered. It is near a fourth.

It may be aſked, how can theſe eſtabliſhments be ſo beneficial to the poor, while they leſſen the expences ſo much? I reply; In two ways. Firſt, in going cheaper to work with every thing than pariſh officers can, who have not the ſame advantages. Weekly allowances in the pariſh, muſt be given in proportion to the abilities of the poor to gain what they want. Diet of all ſorts, firing, cloaths, &c. are all procured by them at the deareſt rate. If they buy cheeſe, it is by the pound; candles, ſingle; ſoap half a pound; and as they have them from the moſt paltry of all ſhops, they conſequently pay extravagant rates for the worſt commodities. This runs through their whole expenditure—they muſt neceſſarily be paid by the pariſh, ſufficiently to enable them to ſupport all theſe diſadvantages.

This is very different at the Hundred Houſe; advertiſements are regularly inſerted in the *Ipſwich* journal when any commodity is wanted, that the truſtees will meet at ſuch a day to receive propoſals, and view ſamples of ſuch and ſuch commodities. Every thing is bought in the great, and paid for at once——no private family lives ſo cheap. In the article of firing, what a vaſt difference between buying by the faggot, for various miſerable fires, and a union of them into ſhip loads of coals? Houſe-rent in the pariſhes was alſo a heavy article; but in what proportion to the rent of the Hundred Houſe, cannot be aſcertained.

The difference in the expence of ſurgery and medicine muſt be immenſe.

The ſecond means of ſaving is this. The Hundred Houſe pays no weekly allowances in the pariſhes; whoever wants aſſiſtance, muſt go to the houſe, unleſs they are really unable. This at once ſtrikes off a very great expence; for in all pariſhes that have no workhouſes, numbers of the poor thro' clamour, or the weakneſs of juſtices of the peace, obtain allowances that would not ſtir from their cottages for twice the ſum: all ſuch are cut off. Beſides the numbers that betake themſelves to a more induſtrious life, in order to keep at home in their pariſhes, all having a much ſtronger inclination for that than to go away.

Theſe, I think, are two very powerful reaſons for the expence being lowered; and in addition to them, the ſuperior earnings ought certainly to be mentioned.——— But in reſpect to the general good.——

It is evident that theſe houſes tend ſtrongly to reduce poor rates, and partly by creating a new induſtry. Are not theſe objects of infinite importance! are they not the remedy of thoſe evils, whoſe enormity has been the ſubject of complaint for ſo many years throughout the kingdom? Is it not therefore greatly incumbent on parliament, to render univerſal, eſtabliſhments that have been long experienced to work ſuch good effects? It is much to be wiſhed that they were made general.

I made the requiſite enquiries into the objections againſt them; and I found but few of any conſequence.

Firſt, The farmers complain that where poor rates are lowered by them, the landlords take advantage of it, and raiſe their rents in proportion.——

I reply:——So much the better; who of

common ſenſe ever ſuppoſed it a contrivance to put money in the pockets of farmers? If rates are lowered, it ought to be the gentleman's advantage; for his eſtate always lets in exact proportion to the height of rates; and if he can let land that is worth 20 *s.* an acre for only 16 *s.* on account of heavy rates, ſurely he ought to have the benefit of raiſing, when he has ſo long laboured under the evil of ſinking?

But the farmers are piqued in many hundreds, and will never agree to the meaſure.

Secondly, It depopulates a hundred; for the poor not liking the houſe, the ſervants let themſelves in other hundreds.

This objection exiſts merely while the eſtabliſhment is local; make it univerſal, and it ceaſes at once.—The reality of the matter was, however, expreſsly contradicted to me, by perſons on whom I can well depend. They aſſured me, that they felt no ſuch evil.

Thirdly, The acts of parliament which eſtabliſh the Houſes, being extremely various, and yet *public* acts, they may be very troubleſome to lawyers in any future pleadings on them.

One act *might* comprehend the whole kingdom. There is no *neceſſity* for every hundred to have a diſtinct act. But ſuppoſe the caſe; let theſe gentlemen take ſo much the greater pains.—Thoſe who are ſo ready with abridgements in 500 folio's; may juſt as well turn over 5000.

Fourthly, Gentlemen will not attend the truſt—it then becomes a jobb in the hands of farmers and tradeſmen.

This objection holds equally againſt all public works executed by commiſſioners; ſuch as turnpikes, drainages, navigations, harbours, &c. &c.—It is too difficult a thing to *force* people to do their duty; and yet we find the works performed. Many are careful enough to attend; ſome won't, and then evils may ariſe which force them to it: but in ſome way or other the buſineſs is done, without any flagrant or ſtriking impoſitions. Thus it would be with Houſes of Induſtry: Some have been erected theſe dozen years, and yet I could not find that any miſchiefs had ariſen from a want of attendance:——making ſuch a progreſs in paying off the debt, does not carry that appearance.

Upon the whole, the objections that have been made to theſe eſtabliſhments are by no means ſolid: but ſuppoſing they were; are we to enjoy none of the benefits of improvement, becauſe objections are ſtarted? What good is gained without its attendant evil? Make a navigation, you waſte land to convert it into water; and you cut through people's properties. Make a turnpike—you tax the whole country. If you will execute no improvement but what may be performed without the leaſt objection—you for ever tye your hands from doing good. Compare the advantages with the inconveniences:—View the ſcale—and then determine. It ſhould be the buſineſs of cavillers alone to ſtart objections, that will not, united, overturn the benefit propoſed: For a nation to conduct itſelf by ſuch ideas, is to revolve into the barbariſm of the darkeſt ages.

The huſbandry of the neighbourhood of *Ipſwich* is in general very good. About *Bramford*, farms riſe from 50 *l.* to 250 *l.* a year; the average from 80 *l.* to 120 *l.* The ſoil in ſome places is all ſtrong clay; in others good loams: much gravelly loam, equally good for both turnips and wheat lets from 10 *s.* to 15 *s.* an acre; average 12 *s.* 6 *d.* The rent from hence to *Hadleigh*, about 13 *s.* The courſe of crops,

1. Turnips
2. Barley
3. Clover one year
4. Wheat.
5. Peaſe or beans.

And,

1. Turnips
2. Barley
3. Clover
4. Wheat
5. Oats.

This addition of oats is bad.

Upon the clay ſoils it is,

1. Fallow
2. Barley
3. Clover
4. Wheat
5. Beans
6. Barley.

Admirable! No courſe can exceed this.

They plough but once for wheat, ſow 2 buſhels, and get 26 buſhels on an average. For barley they ſtir three or four times; ſow 3 buſhels *per* acre, and get 4 quarters on an average. They plough but once for oats; ſow 4 buſhels, and reckon the mean product at 4 ½ quarters. They ſometimes ſow coleſeed for ſeed, and never fail of getting fine wheat after it.

They give from 4 to 6 earths for turnips; always hoe them twice; feed them on the land with ſheep or fattening oxen. They mow ſome of their clover for hay; and ſome they feed the firſt growth, and mow the ſecond for ſeed; they never fail of great crops of wheat after mown clover—but they dung the ſtubble.

In reſpect to manuring, they are excellent farmers: they form compoſts with all their farm-yard dung, mixing it well with what they call chalk, but which I found on trial to be excellent marle. They put about a third part of chalk. Some farmers have limed their land, and with good ſucceſs. All chop their ſtubbles, and ſtack their hay at home. All the way from *Ipſwich* to *Shotley*, and ſo to *Maningtree*, through the hundred of *Sampford*, they are admirable huſbandmen, and have excellent land to work on: they uſe great quantities of ſea ouze, and find it of great uſe; particularly in forming compoſts with their farm-yard dung, which, when well mixed together, they ſpread on their light lands.

They form theſe heaps from the ſea, and their yards in ſpring, and mix them well together through the ſummer for ſpreading on the clover lays for wheat.

All wheat throughout this country that is weedy, is as regularly hand-hoed as their turnips; the price 6*s.* an acre. They alſo hand-hoe all their beans twice; and never fail of ſowing wheat after them.

About *Wolton* and *Felixton* the ſoil is remarkable rich. Their common courſe is,

1. Beans 2. Wheat.

and ſo on for ever.

Nathaniel Acton, Eſq; of *Bramford*, to whom I am obliged for the preceding particulars, has tried various experiments, that cannot fail of being particularly uſeful. Among other crops he has cultivated carrots with ſucceſs.

Experiment, No. 1.

In 1768, two acres of good light turnip loam were trench ploughed, and carrot ſeed harrowed in in *March* without manuring. The plants aroſe very regularly, and were hand-hoed three times, at the expence of thirty ſhillings an acre; and taken up at once as ſoon as the tops withered. They were laid up for winter uſe, and applied chiefly to the feeding horſes, who all did excellently well on them. Mr. *Acton* found that ſuch parts of the heap, as were not packed cloſe together after being well dried, were apt to rot; but all that were dry and cloſe laid, kept perfectly ſound.

Experiment, No. 2.

In 1769, an acre of the ſame ſoil received the ſame culture; thrice hand-hoed, at the above expence; and being carefully dried before they were laid up, and packed cloſe together, none were rotten. Taking up 1 *l.* an acre. Given to horſes inſtead of oats; and they never did better.

Experiment, No. 3.

This year, 1770, he has one acre; a very fine regular crop, cultivated in the preceding manner, and will turn out as good.

Reſpecting the produce, Mr. *Acton* has found but little variation—he has had them accurately meaſured—and finds that the quantity is 6 buſhels *per* rod, or 960 buſhels *per* acre: theſe at 8 *d.* a buſhel, the *Bram-*

ford price, come to 32 *l.* But I beg leave once more to obſerve, that I have found carrots to be worth 1 *s.* a buſhel in feeding cattle; at which price theſe crops have been worth 48 *l.* an acre.—But whether the value is 24, 32, or 48 *l.* is not of much conſequence; for take the loweſt price, and you will find no crop that *Britiſh* fields produce equally profitable.

Experiment, No. 4.

April 3d, 1770, ſome cabbage ſeed was ſown on a bed of rich ground; both the great *Scotch* ſort, and Mr. *Reynold*'s turnip-rooted cabbage: *June* 23d, they were tranſplanted into the field; the ſoil a rich black loam; the firſt ſort 3 feet by 2, the latter 2 feet by 18 inches. I viewed both crops with great pleaſure; they were uncommonly fine: the *Scotch* plants 3 feet over, and *Reynolds* 2 feet; both of a deep green and remarkably luxuriant. I think the turnip cabbage bids fair for being the largeſt crop I have yet ſeen of them. Mr. *Acton* gives both ſorts fair play, for he keeps them as clean as a garden.

Experiment, No. 5.

The *Egyptian* turnip has been tried by this gentleman in ſome ſmall experiments, to ſee if it would do for the ſpring food of cattle—the root proves of a trifling ſize, but the leaves remain in full luxuriance through the ſharpeſt winter; no froſts affect them; and it ſprouts freſh very early in the ſpring.

Experiment, No. 6.

In planting, Mr. *Acton* has tried the *Turin* poplar, and finds that it ſhoots 10 feet in a year, and perfectly ſtraight. He has alſo meaſured the ſhoots of the *Norfolk* willow, 12 feet long. Larches thrive greatly here; they are worth 1 *s.* 6 *d.* each in 9 years; which is an aſtoniſhing profit, and beats the fineſt huſbandry.

Experiment, No. 7.

This gentleman has in the preſent year a remarkable inſtance of the quick vegetation of lucerne, even the firſt year of ſowing. In 1769, two acres of a fine light rich loam were cropped with turnips; the land was ploughed quite fine after feeding them off, and in the ſpring drilled with lucerne; the ſeed failing, it was ploughed up, and again drilled in *July*, and in a month was 12 inches high; it has been hand-hoed thrice: I found it as clean as a garden. The rows are equally diſtant; 22 inches aſunder, very ſtraight, regular, and not ſtraggling; which circumſtances I mention, as it was drilled by hand in the furrow after the plough. It promiſes to be an excellent crop.

Experiment, No. 8.

In Mr. *Acton*'s graſs land, one of the moſt troubleſome weeds he has met with, is the common nettle; and ſo difficult to extirpate, that it has foiled him in many attempts. He tried an experiment in one ſpot on grubbing them; the place was grubbed clean with a pick-ax, the roots taken out, and the ſurface levelled—the nettles came again in as full luxuriance as ever. He then tried mowing them as faſt as they grew high enough for the ſcythe; and this method by perpetual bleeding ſucceeded; it is the only one on which he can depend. It is always of importance to know thoſe methods, which have proved moſt ſucceſsful in the deſtruction of every weed; in this reſpect, matters ſeemingly of no conſequence, are oftentimes paſſed over by inattentive perſons, until they find themſelves in a ſituation that ſhews the impropriety of ſlighting ſuch information. Mowing leſs than three times a year will not deſtroy them.

Experiment, No. 9.

In 1769, nine acres were cropped with turnips and fed on the land. In 1770, it was ſown with barley and graſſes for a meadow; the ſeeds 12 *lb.* an acre of white *Dutch* clover, and 3 ſacks of fine dreſſed hay-ſeeds. I viewed the field, and found the ground covered with a luxuriant growth.

Experiment, No. 10.

Another field was cropped with turnips in 1768; fed off for barley in 1769, and ſeeds ſown with it; 4 ſacks *per* acre of fine hay-ſeeds, 4 *lb* of trefoile, 4 *lb.* of white clover, and 4 *lb* of red clover. After the barley was carried off, it was well manured from the compoſt dunghill. And this year, 50 *C. wt.* of hay *per* acre was mown; and the after-graſs coming on with great luxuriance.

Mr. *Acton*'s common huſbandry is excellent, and his crops good. His courſe of crops is,

1. Turnips, well hoed twice, and worth 35 *s.* an acre.

2. Barley, 5 quarters *per* acre.

3. Clover, which yields 4 ½ tons of hay at 2 mowings.

4. Wheat, on one ploughing, always hand-hoed at the expence of 6 *s.* an acre; the produce 4 quarters *per* acre.

He manures his fields richly; uſes a clayey marle, very rich, if we may judge from the ſtrong effervefcence with acids; he lays from 50 to 90 loads an acre; the ſtrongeſt effect of it is cleaning the land from all weeds, which it does in an uncommon manner; nothing deſtroys poppies more. He makes compoſts of pot-aſh, cow-dung, horſe-dung, and turf, which he mixes well together, and finds it a great improvement. The pot-aſh, 12 *s.* for 70 buſhels. He lays 15 loads an acre of this compoſt.

In the management of his farm-yard he is alſo very attentive to the raiſing dung; he confines all his cattle the winter through, and conducts all the urine that runs off, into a pit, where he abſorbs it all in ſtraw. This is a very good method. It is an unaccountable circumſtance that nine tenths of farmers, gentlemen as well as others, give ſo little attention to this very important part of their buſineſs.

Mr. *Acton* has contrived his cow-ſhed extremely well; it has a hay-ſtack yard behind it, and the racks are open to it, ſo that the hay, without any trouble, is thrown directly from the ſtack into it. His cart horſes are never confined to the ſtable, but have a yard to run about at pleaſure with an open ſhed, under which they run, with a rack and manger for their oats and hay.

Covered drains this gentleman has made in his wet fields with very great ſucceſs; he has found the value of the land doubled by their means: before they were made, it was in vain to ſpread any manure, the effect was ſo trifling; but ſince the drainage every ſpoonful takes effect.

From *Bramſord* to *Hadleigh*, the ſoil is heavier than around *Ipſwich*; they have not the ſame command of turnips. About *Hadleigh* is much ſandy loam called woodcock land; lets on a medium at 15*s.* an acre. Poor rates are 3*s.* in the pound more, and tythe 4*s.* an acre. The country from hence to *Lavenham* runs at 12*s.* an acre; to *Stow-Market* 10*s.* 6*d.*; and to *Colcheſter* 14*s.*

Farms here, riſe from 40*l.* to 300*l.* a year.

Their courſe of crops is,

1. Turnips	3. Clover 1 or 2 years
2. Barley	4. Wheat.

The products;

Of Wheat, 4 quarters *per* acre.

Of Barley and oats, 4 quarters 2 buſhels.

Of Peaſe 2 ½ quarters.

Of Beans the ſame.

Clover they mow once for hay, and get 2 ton an acre. Their turnips are worth from one guinea to three——average 1*l.* 11*s.* 6*d.*

They feed much clover with hogs, which they find a very profitable application of it. Turn them in in *May* of all ſizes, and keep them in it without their coming home, till the ſtubbles are ready for them. The dairy waſh is all kept for young pigs. This management is common here.

Many of their turnips they apply to fattening beaſts; *Scotch* cattle, and alſo the *Yorkſhire* long and ſhort horned. They give from 7*l.* to 9*l.* in *Auguſt*; turn them into ſtubbles, and then to turnips in the field. Some they buy at 3*l.* to 4*l.* 10*s.* and ſell at 40*s.* advantage. Others buy larger cattle to eat off the after-graſs, and then they are put to turnips; and from turnips in the ſpring to the ſummer's graſs; and ſell fat in *July*. But many go off fat from the turnips. This ſyſtem of giving them firſt the after-graſs, and ſelling fat from turnips, they juſtly reckon a very profitable one.

There are large tracts of rich meadow here, that let to 35*s.* an acre. They apply it to grazing and mowing; 2 acres will carry 3 cows through the ſummer: the crops of hay 2 tons an acre. A good cow will give 8 or 9*lb.* of butter a week.

Their principal ſheep huſbandry is to buy wether lambs in *Auguſt*, which they turn into their ſtubbles; then they put them to turnips, making them follow the fatting beaſts. In the ſpring they turn them into the clovers, and keep them there till fat, which will be in *July* or *Auguſt*: they always double their money, and ſometimes do more.

In tillage they reckon 7 horſes neceſſary for 100 acres of arable land; they uſe 3 in a plough, in light work but 2, and do an acre a day; the depth 5 to 7 inches: and generally plough up their ſtubbles before *Chriſtmas*.—Wheel ploughs only uſed.

They reckon 500*l.* neceſſary for ſtocking a farm of 100*l.* a year.

The employment of the poor here, is the woollen manufacture. Many ſpinners and combers; the latter earn 8*s.* or 9*s.* a week; the ſpinners 4*d.* a day. All drink tea; many of them thrice a day.

LABOUR.

In harveſt, 2 *s.* a day and beer.

In hay-time, 1 *s.* 6 *d.* and ditto.

In winter, 1 *s.* 2 *d.*

Reaping 4*s.* an acre

Mowing, making, and cocking graſs for hay, 4*s.* an acre.

Hoeing turnips, 4 *s.* and 2 *s.*

Thraſhing wheat, 2 *s.* 4 *d.* a quarter.

——— barley and oats, 1 *s.* a quarter.

Head-man's wages, 10 *l.* to 10 *l.* 10 *s.*

Next ditto, 7 *l.*

Lad's, 3 *l.*

A dairy-maid, 3 *l.*

Other maids, 2 *l.* 10 *s.*

Women will not work in harveſt, only glean.

PROVISIONS.

Bread, – –	1 ¼	*d. per lb.*
Cheeſe, – –	4	
Butter, – –	9	*per* 20 ounces.
Beef, – –	3 ½	
Mutton, – –	4	
Veal, – –	3 ½	
Pork, – –	4	
Milk, – –	½	*d. per* pint.
Potatoes, – –	4	*per* peck.

Labourer's Houſe-rent, 40 *s.*

——— firing, 30 *s.*

The particulars of a farm as follows.

300 Acres in all	16 Horſes
250 Arable	6 Cows
50 Meadow	18 Young cattle
£. 200 Rent	40 Swine

62 Acres Turnips
62 Barley
62 Clover
62 Wheat

4 Men
1 Boy
2 Maids
4 Labourers

All this country has been chalked; the quantity generally 10 waggon loads an acre. But now they mix it with farm-yard dung, and reckon this management of it the beſt huſbandry.

Many of them chop their ſtubbles; and all ſtack their hay at home.

Some of my readers may perhaps remember a paſſage in my *Six Weeks Tour*, wherein I gave an account of a field of lucerne of doctor *Tanner*'s. On coming again to *Hadleigh* I was very deſirous of ſeeing it, and having further information concerning it, as it is now ſeven years old. The Doctor was ſo obliging as to ſhew it me: I found the field very regularly planted; the bare ſpots quite inconſiderable; the verdure fine, and very few weeds in it. The Doctor expects it to laſt 10 years longer. Reſpecting the produce, it is as great as ever: He has a very clear way of deciding the value of it, from the particular circumſtance of always feeding three ſmall meadows before he had the lucerne, and always mowing them ſince: they yield juſt 14 loads of hay weighed dry in the winter; and the average price is 40*s.* a load: the four acres of lucerne, therefore, ſave him 28*l.* in hay, beſides maintaining 80 ſheep a month every autumn, which at 3*d.* a week, comes to 4*l.*; the whole produce is therefore 32*l.* the four acres, or 8*l.* *per* acre. This is greatly to the honour of broad-caſt lucerne, and proves very clearly its immenſe importance.

If the firſt crop was mown for hay, the produce would be 30 *C. wt.* an acre; and the Doctor finds a load of it to be as good as a load and half of any other hay. I examined a parcel of the hay, and never ſaw any that equalled it either in ſcent or colour, and the leaves were all on.

It is the only food of his cows; and none give better milk, cream or butter; the butter is uncommonly excellent. Some of his horſes are fed totally on it, without either oats or hay; I ſaw them, and they are quite fat, with marbled coats, though conſtantly worked.

It is manured once in four years, with about 12 loads an acre.

Upon the whole, Doctor *Tanner* is clear in the uncommon advantages of ſowing lucerne broad-caſt. The only culture it requires, is a thorough harrowing in *February* or *March*, and ſcattering a little ſeed in the patches where it fails: and the convenience of ſo ſmall a portion of land maintaining ſuch a great ſtock of cattle, is unequalled in any other crop.

The country is pretty rich, and well cultivated to *Lavenham*, and ſo on to *Haſtead*; about which place the ſoil is chiefly clay, or clayey loam of a looſe nature, hollow and damp: lets from 9*s.* to 20*s.* an acre; average about 14*s.* 6*d.* Farms riſe from 20*l.* to 130*l.* a year. The courſe of crops on their ſtiff land, is

1. Fallow
2. Wheat;
3. Barley

and a vile one it is. On the lighter land;

1. Turnips
2. Barley
3. Clover
4. Wheat;

which is far different. They plough five or ſix times for wheat, ſow 2 buſhels, and reap on a medium 2 ½ quarters. For barley they ſtir 2 or 3 times; ſow 4 buſhels; and 3 quarters the average crop. For oats they plough but once, ſow 4 buſhels, and reckon the mean produce 3 ½ quarters. *Edward Manning* of this place has had 40 quarters from 4 acres; and *Michael Mortlock* 15 quarters an acre, which is the greateſt crop I ever heard of. They plough but once for peaſe; ſow 2 buſhels an acre; very ſeldom hoe them; the crop 2 ½ quarters.

For turnips they plough five or ſix times; hand-hoe twice; and reckon the mean value 40*s.* an acre; uſe them for ſheep; and ſome few for fattening beaſts.

Clover they both feed and mow for hay; get from 20 to 30 *C. wt.* an acre at one cutting. Some they feed; get 4 buſhel an acre on an average, ſometimes 8. They reckon the wheat as good after ſeed as hay, but rather better after feeding than either, but never ſo clean.

Folding ſheep is never practiſed. But all the farmers chop their ſtubbles, and ſtack their hay at home; and ſome bring dung from *Bury.*

Many of them are very good farmers in

the

the article of draining: They make all covered drains; 32 inches deep; 2 ½ inches wide at bottom, and a ſpit at top; the price of digging and filling from 3 *d.* to 4 *d.* a rod: but of late years they have got into the way of ploughing the firſt ſpit, by going a bout or two with the common plough, and then digging one or two ſpits, in which manner they pay only 2 *d.* a rod. They fill firſt with buſhes, and then with wheat ſtubble.

The beſt graſs-land lets at 20 *s.* an acre; they apply it all to the dairy; and reckon that an acre will carry a cow through the ſummer. The breed, a little mongrel ſort; they give on an average 4 gallons of milk a day; but good ones 8 gallons; the annual product 5 *l.* They underſtand very well the management of hogs depending on cows; for they keep at the rate of 2 ſows, and all the pigs bred by them, to every 10 cows. The winter food of their cows is ſtraw, with ſome hay and turnips at calving.

Their flocks riſe from 20 to 80; the moſt common ſheep huſbandry is to buy old crones as they call them, that is, old ewes, in *September*, at from 5 *l.* to 8 *l.* a ſcore. Theſe they keep a year, and ſell the couples fat from 16*l.* to 19*l.* a ſcore.

In their tillage, they reckon 6 horſes neceſſary to 100 acres of ploughed ground, uſe 2 in a plough, and do an acre a day. The annual expence of a horſe they reckon at 7*l.* They do not break up their ſtubbles till after barley ſowing. The price of ploughing 4*s.* an acre; the depth 4 or 5 inches. They all cut ſtraw into chaff.

They calculate 400*l.* to be requiſite for ſtocking a farm of 100*l.* a year.

Land ſells at 30 years purchaſe.

Poor rates 3*s.* in the pound: the employment ſpinning wool, at which a woman earns 4*d.* a day. They all drink tea.

The farmers carry their corn 25 miles.

The particulars of farms.

160	Acres in all	1	Maid
120	Arable	3	Labourers
40	Graſs	24	Acres Wheat
£. 108	Rent	24	Barley
8	Horſes	24	Fallow
10	Cows	24	Clover
6	Young cattle	10	Turnips
60	Sheep	14	Peaſe and beans.
1	Man		
1	Boy		

Another :

150	Acres in all	1	Boy
75	Arable	3	Labourers
75	Graſs	2	Men
£.120	Rent	20	Acres Wheat
6	Horſes	20	Fallow
20	Cows	10	Barley
5	Young cattle	10	Clover
50	Sheep	5	Turnips
2	Maids	10	Oats.

From *Hadleigh*, another way, I took the road to *Maningtree*, through a country rich and very well cultivated. In that part towards *Hadleigh*, the huſbandry is pretty much the ſame as in the account I gave above. About *Maningtree* it reſembles the methods around *Ipſwich*. They uſe much rich marle from *Kent*, which is brought by ſhipping; they call it chalk.

At the village of *Lawford*, very near to *Maningtree*, lives a moſt ingenious ſmith, Mr. *John Brand*: whoſe mechanical abilities would do honour to a ſuperior ſtation. He has invented various implements of huſbandry, of which I have myſelf had near ſeven years experience, and will venture to aſſert that he has failed in nothing. Among other things, he makes an iron ſwing plough, to be drawn by a pair of horſes, which much exceeds any plough I have yet ſeen, in cutting a true, regular furrow, well cleared of the looſe moulds; or in turning over graſs land; at the ſame time, that in ſtrength and duration it is far preferable to all. The eaſe and ſimplicity of the variations are excellent. He has alſo invented other iron ploughs for 4 and 6 horſes, for ploughing from 1 to 2 feet deep.

Another machine of very great utility, is an horſe-rake on wheels, for raking ſpring corn ſtubbles, which performs in a very complete manner, and will in level fields rake hay.

Likewiſe a hand-mill for grinding wheat, which anſwers (as I have been informed by ſeveral perſons) exceedingly well.

He has made ſeveral other tools, that have been tried and approved by many farmers. He has ſo quick a comprehenſion in theſe matters, that I have but little doubt but he would execute any new idea ſtarted to him with uncommon ſucceſs. Deſcribe the powers required, and the force you will allow, and I believe no man in *Britain* will ſooner perform it.

I cannot but recommend this very ingenious mechanic to the attention of the public;—he has abilities far ſuperior to the obſcurity in which he lives.

From *Maningtree* to *Colcheſter*, the country is all rich and excellently cultivated. I made enquiries into it, and found their methods quite ſimilar from thence beyond *Colcheſter*. About that town, and moſt of the way to *Witham*, they excell greatly.

About *Lexden* and *Stanway*, farms riſe from 20*l.* to 1000*l.* The ſoil is a ſandy gravel, with ſome brick earth; lets from 12*s.* to 20*s.* an acre. From *Colcheſter* to *Witham* about 13*s.*

The courſe of crops,

1. Turnips
2. Barley
3. Clover 1 year
4. Wheat :

and ſometimes the following crops added to theſe;

5. Beans or peaſe
6. Wheat.

After beans, they plough twice or thrice for wheat; ſow 2 ½ buſhels an acre, and reap 3 ½ quarters on an average; they have ſometimes to 5 ½ quarters; but it is all hand-hoed. They ſtir their turnip land four times for barley; ſow 4 buſhels, the end of *March*, and through *April*; the mean produce 6 quarters. For oats they plough from once to 3 times; ſow 5 buſhels, and gain from 6 to 10 quarters; 8 the average.

Their turnips they always hand-hoe twice; the crops are generally worth 3*l.* an acre. One acre will fatten a beaſt of 40 or 50 ſcore in the field, to eat the turnips on the land.

For peaſe they give but one earth; ſow 2 buſhels an acre, hoeing them into drills at 3*s.* or 3*s.* 6*d.* an acre expence. They hand-hoe them thrice, ſo as to keep them as clean as a garden; the expence is 3*s.* the firſt hoeing; 2*s.* 6*d.* the ſecond, and 2*s.* the third. The average produce 4 quarters; ſometimes they get 5 or 6. They likewiſe plough but once for beans; dibble them in, in rows 9 inches aſunder; 2 buſhels of ſeed *per* acre; and always give the ſame hoeing as to peaſe, and at the ſame expence. The crops are never ſmall, generally from 5 to 10 quarters an acre; average 6 or 7. Uſe both the horſe and tick bean.

Coleſeed they ſow both for food and the ſeed; they feed it in *April* with ſheep and ſwine, after the turnips are gone, and then plough it up for a crop of turnips.

Much of their clover is fed by ſheep, hogs, and horſes; when they mow for hay, they get great crops; 2 loads an acre at a cutting, and ſometimes 3; and reckon that an acre in food and hay, pays 4*l.* 4*s.* on an average. A good deal of chalk is uſed about *Colcheſter*, and all the way to *Maningtree*; and likewiſe yet more towards and about *Maldon*: It comes all from *Kent*. The farmers give 7 to 8, and 9*s.* a waggon load for it; and many of them fetch it ſeveral miles; even from 6 to 10. They lay 7 loads an acre, and all agree that it laſts longeſt, and at the ſame time does beſt on ſtiff lands: the ſandy and gravelly loams are not ſo profitable to chalk as the clayey ones, and ſtiff clays: on the latter it laſts from 30 to 40 years; but on the former it holds good for 15 years. I have, with them, called it chalk; but I found from trial that it is a very rich marle.

Great quantities of dungs of all ſorts are brought from *Colcheſter*; the price 5*s*. or 6*s*. a waggon load, and they lay 7 or 8 on an acre.

All chop their ſtubbles; and ſtack their hay at home. But no folding ſheep is practiſed.

Much ſoot is bought at 6*d*. a buſhel; they ſow it on their paſtures.

Malt duſt they ſow on the barley tilth.

In their tillage they reckon 4 horſes neceſſary for 100 acres of ploughed ground; uſe 2 in a wheel plough, and do from 1 to 2 acres a day. They ſtir 5 or 6 inches deep; the price 4*s*. an acre: the ſtubbles are all broken up before *Chriſtmas*.

In the hiring a farm of 300*l*. a year, they reckon 2000*l*. neceſſary to ſtock it, if the land is at all out of condition.

Land ſells at 30 years purchaſe. Tythes are 3*s*. 6*d*. in the pound. Poor rates 3*s*.; in *Colcheſter* 6*s*. or 7*s*. In ſome pariſhes in that town they riſe to 16*s*. or 17*s*.

Agriculture is here carried on in general with very great ſpirit; for the farms are chiefly large, and the farmers rich: ſome of them are worth from 30,000*l*. to 40,000*l*.; many above 20,000*l*.

The following are the particulars of a farm.

400 Acres in all
360 Arable
40 Graſs
£. 330 Rent
12 Horſes
8 Cows
90 Acres Wheat
90 Barley
90 Clover
90 Turnips.

From *Witham* towards *Chelmsford*, about *Boreham*, &c. the ſoil is heavier than at *Colcheſter*; being a mixed clayey loam; lets from 10 *s.* to 12 *s.* Farms are from 100 *l.* to 150 *l.* a year.

The courſe,

1. Turnips
2. Barley
3. Clover
4. Wheat.

Here the good farmers ſtop; but bad ones add,

5. Oats.

The products:

Wheat, 3 quarters.
Barley, 5 ditto.
Oats, 6 ditto.
Peaſe, 5 ditto.
Beans, 5 ditto.

Both peaſe and beans are all hand-hoed. Many turnips cultivated on clayey ſoils too heavy to feed off, but they draw them for ſheep, cows, and beaſts.

A great ſpirit of manuring is found throughout all this country. They bring ſome chalk from *Maldon*; give 8*s*. to 10*s*. a waggon load for it, and lay from 6 to 8 loads an acre: 6 or 7 miles carriage makes this ſo great an expence, that they have of late years tried to ſubſtitute their own clay for it: they lay 60 loads an acre; and from the obſervation they have made, think it will laſt a leaſe of 21 years.

Lime they alſo uſe; lay a buſhel to a ſquare perch; it laſts 7 years; but more, if mixed with dung and earth.

LETTER XVI.

BEFORE I proceed in my journey, I ſhall here make a pauſe, to obſerve in general, that part of the country through which I have lately paſſed, is as remarkable for excellent huſbandry, I apprehend, as any in the kingdom. The uncommon exertions of ſpirited culture on the ſands near *Woodbridge*, I have already remarked: The great fertility of the ſoil, and the incomparable uſe they make of it, I have obſerved above; particularly their courſe of crops being ſo well adapted to keeping the land free from weeds: the culture of carrots; the drill and hoeing management of peaſe and beans; the ſingular uſe of crag as a manure; their noble breed of horſes, with ſeveral other particulars that ſtamp an excellence ſeldom found among common farmers.

After this country, comes the tract of land in the neighbourhood of *Ipſwich*, which is cultivated in a very complete manner, and a ſpirited uſe made of various manures. Moſt of *Sandford* hundred boaſts a huſbandry of a ſuperior kind; marle is much uſed; great things are done with the aſſiſtance of ſea ouze; at the ſame time that all other manures are perfectly well underſtood. From *Maningtree* to *Colcheſter*, and thence to *Witham*, the farmers are perfectly enlightened; throughout this tract as well as the laſt, all the peaſe and beans are kept as clean by hand-hoeing, as turnips in other places, but at a much greater expence; wheat alſo receives the ſame operation, which I think is a certain mark of the farmers having extreme juſt ideas of huſbandry; for without ſuch, they would never arrive at ſo unuſual a practice. Marle, called chalk here, they uſe, I believe, at a much greater expence than any people in the kingdom; for many of them go from 6 to 10 miles, and give from 8 *s.* to 10 *s.* a waggon load for it: this is acting with a ſpirit that cannot be exceeded. Town manures at *Colcheſter* ſell at 5 *s.* a load: ſoot, &c. &c. are uſed in large quantities; and theſe noble exertions are not the effect of low rents, as ſome fondly imagine they muſt every where be; on the contrary, this whole country is let at good rents; that is, from 12*s.* to 25*s.* an acre: and various places, in which all theſe circumſtances unite, pay 16*s.* or 18*s.* an acre round; and ſome 20*s.* Such a rent by no means frightens theſe ſenſible men; they expend great ſums of money in the purchaſe of manures, and ſpare no expence in hoeing, notwithſtanding that of rent.—— What is the conſequence of this? Their rich ſoils ſo thoroughly manured, produce vaſt crops without damage from weeds, for their perpetual hoeing totally deſtroys them. The effect is anſwerable—from 4 to 5 quarters an acre of wheat; from 5 to 10 of barley; from 6 to 10 of oats; 5 or 6 of beans; and all other crops proportioned— with farmers worth from ten to forty thouſand pounds. Theſe ſhew ſufficiently that the above ſpirited practices form what might emphatically be called TRUE HUSBANDRY. Thoſe who exalt the agriculture of *Flanders* ſo high on compariſon with that of *Britain*, have not, I imagine, viewed with attention the country in queſtion. It is difficult to imagine common crops cultivated in greater perfection.

LETTER

LETTER XVII.

FROM *Chelmsford* to *Dunmow* the ſoil is various, but chiefly heavy; near the former place it is all turnip land, but afterwards clay, at 12 *s.* an acre.

From *Dunmow* to *Hockerill* it is all clay, at 15 *s.* an acre: the whole country quite flat, and all hollow drained. I obſerved a large portion of the land was ſummer fallow, and ridged up in 3 feet lands ready for wheat, lying in a moſt neat and clean manner; but no turnips in the country. The borders of the arable fields are all dug away, from a foot to 18 inches deep, and carried on to the land, which drains the fields at the ſame time that much manure is raiſed.

The crops here amount nearly to the following products; Wheat, 3 ½ quarters *per* acre; Barley on ſummer fallow, 5 quarters; Oats, 6 quarters; Peaſe, 3 quarters; Beans, 4.

From *Dunmow* to *Braintree* the ſoil is chiefly clay; and lets at 15 *s.*

From *Dunmow* to *Thaxtead*, and from thence to *Clare*, the ſame; with ſome ſpots of turnip land.

From *Hockerill* to *Ware*, near the former place, the farmers are very neat; but they have ſome practices by no means defenſible, though followed from an idea of good huſbandry. They often ſow barley after turnips, and then ſummer fallow for wheat; which is as extraordinary a courſe as ever I met with. I enquired particularly into the reaſon of ever omitting clover in ſuch a caſe; and was anſwered, that clover fouls and ſpoils the land: however ſeveral of them have better ideas, and practiſe the excellent huſbandry of, 1. Turnips: 2. Barley: 3. Clover: 4. Wheat; and they find it to anſwer extremely well. Land here lets at 15*s.* an acre: their crops are, Wheat, 3 ½ to 5 quarters; Barley, 5 to 7; Beans, 3 or 4.

About *Youngsberry*, the ſeat of *David Barclay*, within 3 miles of [illegible] the huſbandry is various. Farms riſe from 30*l.* to 300*l.* a year, but on an average are 100*l.* to 150*l.* The ſoil may be diſtinguiſhed moſt properly into heavy and light; that is, turnip land, and ſuch as will not bear that root. The rent at an average 12 *s.* an acre.

Their courſes,

1. Fallow
2. Wheat
3. Peaſe.

1. Fallow
2. Wheat
3. Beans and oats mixed.

Alſo,

1. Fallow
2. Barley
3. Peaſe.

Likewiſe,

1. Turnips
2. Barley
3. Peaſe.

They plough three times for wheat; ſow 2 buſhels and a peck, and gain 20 in return. They plough, in ſummer fallowing, thrice for barley; turnip land but once; ſow 4 buſhels an acre in *March*, and gain 30 buſhels on an average. For oats they give but one earth; ſow 4 buſhels, and reckon the mean crop at 4 quarters.

For peaſe they ſtir only once; ſow 4 buſhels, never hoe them; the produce at a medium 16 buſhels; 60 buſhels were once produced by an acre, after turnip land barley.

Their culture of beans is, I think, as bad as in any part of *England*; they always mix them with oats. Firſt, they ſow 2 buſhels an acre of beans, and ſome time afterwards they harrow in 1 ½ of black oats; the crop of both, about 20 buſhels. The oats conſtantly ſhell, and are half loſt before the beans are ready to cut; and to remedy this in part, they are induced to cut the beans too ſoon, and then as ſurely find them a thin and hollow ſample: they own theſe diſadvantages, and yet perſiſt in ſuch a ſlovenly method. I ſhould alſo add, that this cuſtom quite excludes the moſt profitable one of hand-hoeing. It much behoves the good huſbandmen of this country to diſcountenance ſo execrable a practice.

They plough thrice for turnips; hand-hoe them once, and eat the crops off with ſheep: the average price, 35*s.* an acre.

They generally mow one growth of their clover crops, and feed one; the produce of the firſt 1 ½ load of hay an acre: many keep it 2 years on the ground, but it is reckoned beſt to have it only one. Some mow twice for hay; get 1 load at the ſecond cutting; and others leave it for ſeed: Wheat they reckon beſt after feeding.

In their manuring, they depend pretty much on folding ſheep, but do not practiſe it in winter, except on very dry land. They fold once in a place: 230 ſheep will do an acre in a week. They fold all ſorts, but reckon a wether fold much the beſt.— They chop their ſtubbles for littering the farm-yards; and ſtack all their hay at home; not much for ſale. Chalk they ſpread on their lands, about 20 loads an acre; it does beſt on heavy ſoils; laſts 6 or 7 years.

Aſhes they ſow on light land, chiefly on clover, 20 buſhels an acre, and find the improvement great.

Malt-duſt they uſe at the price of 7*s.* or 8*s.* a quarter; uſe from 3 to 4 *per* acre. Pidgeon's dung they ſpread on barley land, 20 buſhels an acre; and find that it beats all other manures.

Under ground drains are common; they find the improvement remarkable. They plaſh their hedges, but have ſcarcely any ditches, even in the clay land.

Good meadow land lets at 30*s.* an acre;

they mow it all, and get 1 ½ load of hay an acre; two acres will keep a cow through the ſummer. A good cow will give 3 gallons of milk a day during half the ſeaſon; and 5 *lb.* of butter a week: the total annual produce 5 *l.* They keep about 15 hogs to 10 cows. A dairy-maid will take care of 10. The winter food chiefly graſs, but hay at calving; they keep all in the yard except at calving. In fatting cattle, they buy in beaſts in *Auguſt*, that are forward in fleſh; they put them to the eddiſhes, and from thence to turnips, upon which they are kept four months; but they are drawn and thrown on graſs land; a beaſt of 100 ſtone (8 *lb.*) will be fattened by an acre and half.

Hogs fattened to 40 ſtone; but 26 the average.

Flocks of ſheep riſe from 100 to 400. The profit they reckon at,

Lamb,	- -	0	8	0
Wool,	-	0	3	0
		0	11	0

The management of ſheep is various. They buy in wethers, 2 years old, in *October*, or *November*, at 14*s*.; keep them one year; firſt they are put to ſtubbles and then to ſome turnips; after that they have ſome clover, from which they are ſold fat: they are folded all ſummer through.

The average fleece 6 *lb.*

In reſpect to the rot, they hold that the diſtemper is by no means owing to a quick luxuriance of growth, diſtinctly taken, but to overflowings of graſs land; no rot known but from the latter cauſe.

In their tillage, they reckon 4 horſes neceſſary to 100 acres of arable land: they uſe 4 in a plough, with a driver; do an acre a day, from 4 to 5 inches deep; the price 6 *s.* or 7 *s.* an acre. The annual expence of a horſe they reckon at 10 *l.* 10 *s.* The weekly allowance of oats, is 10 buſhels to 4 horſes. They do not break their ſtubble till after *Chriſtmas.* Both wheel and ſwing ploughs uſed. The hire of a cart 4 horſes, and a driver, 10 *s.* a day.

In the hiring and ſtocking farms, they reckon 1200 *l.* neceſſary for 200 *l.* a year.

Land ſells at 30 years purchaſe.

Poor rates 3 *s.* in the pound; 20 years ago were not 1 *s.* 6 *d.*; only 1 *s.* in *Ware*, becauſe they have a poor workhouſe, wherein hemp is ſpun for ropes, and thread for netting and ſacking. Tythes are chiefly compounded; Wheat 4*s.* or 5*s.* an acre; Barley the ſame; Oats 2*s.* to 2*s.* 6*d.*; Turnips 1*s.* to 2*s.*; Clover 1*s.*

The employment of the poor women, &c. ſpinning, at which they earn 4*d.* a day. All drink tea twice a day.

Moſt of the farmers have leaſes.

LABOUR.

In harveſt, 36*s.* to 40*s.* and board.
In hay-time, 1*s.* 6*d.* a day.
In winter, 1*s.* 2*d.*
Reaping, 4*s.* to 5*s.*
Mowing barley and oats, 1*s.* to 1*s.* 6*d.*
——— graſs, 2*s.*
Hoeing turnips, 4*s.* to 5*s.*
Plaſhing a hedge, 4*d.* a rod.
Thraſhing wheat, 3*d.* a buſhel.
——— barley, 2*d.*
——— Oats 1½ *d.*
——— peaſe and beans, 1*s.* for 5 buſhels.
Head-man's wages, 8*l.*
Next ditto, 7*l.*
Lad's, 3*l.*
Dairy-maid, 5*l.*
Other ditto, 4*l.*

Women *per* day, in harveſt, 1 *s.* and board.
——— ——— in hay time, 8 *d.*
——— ——— winter, 6 *d.*

Value of a man's board, waſhing and lodging, 5 *s.* a week.

There is no riſe of labour by the day; but the good labourers will only work by the piece, which was not the caſe formerly.

PROVISIONS.

Bread,	1 ¼ *d.*	*per lb.*
Cheeſe,	4	
Butter,	8 ½	
Beef,	3 ¾	
Mutton,	4	
Veal,	5	
Pork,	3 ¼	
Bacon,	6	
Milk,	½ *d.*	*per* pint.
Potatoes,	3	*per* peck.
Candles,	7 ½	*per lb.*
Soap,	6	ditto.

Labourer's home-rent, 40 *s.*
——— firing, breaking hedges and cutting trees.

The following are the particulars of a farm here.

300 Acres in all
30 Graſs
270 Arable
£. 180 Rent
8 Horſes
8 Cows
200 Sheep
20 Young cattle
40 Acres Wheat
40 Barley
20 Oats
20 Peaſe
10 Clover
20 Turnips
100 Fallow
3 Men
2 Boys
2 Maids
4 Labourers.

David Barclay of *Youngsberry* has executed ſome experiments in agriculture that are of conſequence. I am much indebted to him for the following particulars, as well as the preceding account of the common huſbandry around him.

WINTER TARES.

Experiment, No. 1.

Upon a ſtrong mixed ſoil, not ſo heavy that it would not do for turnips, ten acres were ſown with winter tares, after barley, on one ploughing, 2 ½ buſhels *per* acre. The ſecond week in *May* they were begun for ſoiling horſes: they laſted 25 horſes 9 weeks, which, at 2 *s.* 6 *d.* a horſe *per* week, come to 2 *l.* 16 *s.* an acre. No manure was uſed, and the tares were off time enough for turnips.

MANURES.

Experiment, No. 2.

A field of turnip land gravel was manured for wheat, with trotters from *London*, rabbits dung, and the ſheep fold. Six quarters an acre of the trotters coſt,

at 7 *s.* a quarter,	£. 2	2	0
Carriage, 1 *s.* 6 *d.* - -	0	9	0
Per acre, - -	2	11	0
Rabbit dung 10 quarters, at 2 *s.*	1	0	0
Carriage, 1 *s.* - -	0	10	0
Per acre, - -	1	10	0

The other folded; 40 herdles, 10 of each ſide, 8 feet each, for 230 ſheep.

The effect was; the trotters produced 25 buſhels *per* acre; the fold, 20 buſhels; and the rabbit dung 15 buſhels.

	Buſhels.
Trotters, - -	25
Fold, - - -	20
Superiority, - -	5

Which at 5 *s.* is 1 *l.* 5 *s.*

Trotters, - -	25
Rabbits dung, - -	15
Superiority, - -	10

At 5*s.* is 2*l.* 10*s.*

It appears clearly from hence, that the trotters are vaſtly ſuperior to the rabbit dung, and ſomething better than the fold: indeed the rabbit dung is ſo ſmall a produce, that one can hardly ſuppoſe it did any benefit at all.

Experiment, No. 3.

Coal aſhes ſifted fine, were compared with dung as manure for graſs-land. 160 buſhels *per* acre were ſpread, at 3½*d.* a buſhel, all expences included. On the other part, 16 loads an acre of dung, quite black and rotten, that had been turned over and well mixed together. The reſult was, that the aſh'd part produced a load and three quarters of hay *per* acre; the dunged ¾ of a load: much white clover with the former, but none among the latter. Before the manuring, the products were not more than ½ a load an acre. I viewed the after-graſs of the trial, and could trace exactly, by the thickneſs of the graſs and the verdure, where the aſhes were laid.

Experiment, No. 4.

Rape oil cake duſt was tried on barley, ſowed with the ſeed and harrowed in; 2 quarters *per* acre, at 15*s.* a quarter. The effect remarkably great; the crop 5 quarters *per* acre, which is much more conſiderable than ever ſeen on the land.

Experiment, No. 5.

Malt-duſt Mr. *Barclay* has tried for barley; 4 quarters *per* acre, at 7*s.*; and from the appearance of the crop, has great reaſon to think that it anſwered well.

DRAINING.

Experiment, No. 6.

Above fifty acres of wet, heavy, loamy clay, and clayey ſoil, were drained in one winter by covered drains. The leading drains were cut 28 inches deep; and the branches 22 inches; 3 or 4 inches wide at bottom, and 9 at top. The digging and filling the 28 inch ones, 3*d.* a rod; and the 22 inch, 2 *d.* They were filled with black-thorn buſhes at 9 *s.* a load, of 80 large faggots—3 loads did the drains of an acre of land, cut within a rod of each other. The improvement of theſe drains is ſtrongly viſible, though done only laſt winter.

CABBAGES.

Experiment, No. 7.

Three acres of ſtrong clay land were ſummer fallowed laſt year, and the beginning of this. The ſeed of the great *Scotch* cabbage, &c. was ſown in *April*, and the plants ſet on 3 feet ridges, 2 feet from each other, the 24th of *June*. They were horſe-hoed twice with a ſhim, which cuts the land without turning a ridge: the rows hand-hoed twice; and after that the furrows ſtruck with a common plough, earthing up the plants.

The ſhim with one horſe did 3 acres a day. Beſides the great *Scotch*, ſome brown cole, and turnip cabbages were planted, all of which are in a very thriving condition, and to the honour of the cultivator, as clean as a garden.

DITCHING.

Experiment, No. 8.

By a compariſon between the cutting a ditch with ſpades in the common manner, and ploughing it, it appeared that a ditch 30 rod long, cut by the ſpade,

	£.	s.	d.
coſt - - -	£. 3	0	0

By ploughing, 6 horſes and 20 men did 30 rods in one day.

20 Men, - - -	1	3	4
6 Horſes, - - -	0	12	0
	1	15	4

The ſpade, -	£. 3	0	0
The plough, - -	1	15	4
Superiority of the latter,	1	4	8

In the labour of the 20 men, is included their paring down and finiſhing the ſides of the ditch, and the bank. This is certainly a very conſiderable improvement, and deſerves the attention of all who cut new ditches.

FATTING BEASTS WITH OIL-CAKE.

Experiment, No. 9.

In 1769, ten oxen were bought and put to lint-ſeed cake.

They coſt, - -	£. 60	0	0
Commiſſion, - -	0	15	0
Driving, &c. - -	0	8	0
December 30.—6250 cakes, -	33	0	0
Carriage of 4 waggon loads, at 21 *s.* - - -	4	4	
November 6. to *April* 10. Four months hay, 6 *lb.* each *per* diem, at 40 *s.* a load, -	10	14	0
Labour, - - -	7	0	0
Two of them 3 weeks at graſs, at 6 *s.* - -	0	18	0
Four had an acre of turnips, -	2	0	0
	118	19	0

Produce.

By 10 oxen received, -	120	0	0
Expences, - - -	118	19	0
Profit, - . - -	1	1	0

The beaſts were well littered with ſtraw, and raiſed a vaſt quantity of dung; they were ſtalled, and never let out; water was given in pails thrice a day. A thouſand cakes, which come to 5 *l.* 5 *s.*, weigh 1 ton 7 *C. wt.* 3 quarters.

I muſt obſerve on this account, that the clear profit in money is by no means the object;—the dung is the great advantage. Thoſe who can command ſtraw, ſtubble, fern, or other litter, and can convert it into the richeſt dung without loſs on the ox account, will make a very great profit in the high improvement of their land. No manure exceeds the dung of oil-cake fed beaſts; it is the moſt fertile of all. Had Mr. *Barclay* bought the ſtraw, and meaſured the dung, the truth of this obſervation would be ſufficiently clear. But I muſt further remark, that the charge of 7 *l.* for attendance ſeems very high. In a convenient ox-houſe that expence might be much reduced; witneſs the practice of Mr. *Moody* of *Retford*.

HEDGES.

Experiment, No. 10.

In fencing, Mr. *Barclay* has made a trial of tranſplanting old quick ſtubbs to form a new hedge. He was very doubtful of their ſucceſs, but none could thrive better: this reminds me of the ſame practiſed to a large extent by the Rev. Mr. *Hall* in *Yorkſhire*.

SPIKY ROLLER.

This implement (procured of *John Arbuthnot* Eſq; of *Mitcham*) has been uſed on ſome very ſtrong cloddy land in ſummer fallowing with very great ſucceſs; it reduced ſome very rough land, at twice going over, to a fine tilth, at a ſeaſon when a plough could not have been of the leaſt ſervice. The expence of the operation as follows:

5 Horſes, -	£. 0	10	0
1 Man, - -	0	1	6
	0	11	6

It rolls 1 ½ acre, twice in a place, *per* day;

the expence conſequently is 7*s.* 8*d.* an acre *.

From the activity and judgment with which *David Barclay* begins his huſbandry, the public has no ſlight reaſon to expect that it will be of general utility: his readineſs in trying, and his accuracy in relating, will render his experiments very valuable.

At *Eſenden*, in the way from *Ware* to *Hatfield*, Sir *William Baker* has built a barn, which is the moſt coſtly one I have ſeen. It is 84 yards long, 15 broad; the whole raiſed on capt ſtones, ſo that a mouſe cannot get into it: The whole floor is equally for thraſhing. The ſides, &c. are boarded and painted blue, and the roof is ſlated.

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* YOUNGSBERRY is a plain neat edifice, built by Mr. *Paine*; the ſituation very beautiful, on the brow of a waving hill, ſcattered with trees. It commands a fine view of rich incloſures; various from the inequalities of the country.

In the vale, which winds at the bottom of the hill, Mr. *Barclay* has cut a large river, that enriches his proſpect greatly, and gives the whole ſcene a livelineſs which (however pleaſing) it could not otherwiſe poſſeſs.

I croſſed from *Hertfordſhire* into *Surry*, paſſing through *Clapham* † in the way to *Peterſham*, where I had the pleaſure of viewing the farm of Mr. *Ducket*, whoſe mechanical abilities are ſo well known by the invention of two moſt excellent ploughs.

All his fields are ſand, of two ſorts; one very light and rather poor; the other is moiſt, black, and good. Moſt of his arable crops are cultivated in the drill method : His turnips, barley, oats, and wheat, are chiefly in rows : the turnips 12 inches to 2 feet aſunder ; the wheat and oats from 9 to 12 inches, equally diſtant. He hand-hoes all theſe crops ſufficiently to keep them clean ; and finds, from repeated experience, that the crops are better than in the broadcaſt mode, at the ſame time that the land is

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† At this place Mr. *Thornton* has an ornamented paddock, laid out in an agreeable manner; in ſome particulars, different from the common method of ſketching them. It conſiſts of a varied lawn well ſcattered with ſingle trees and ſome clumps, and ſo incloſed with wood as to be perfectly rural, though ſo near *London*. A gravel walk runs around the whole, and encompaſſes ſeveral meadows, to the extent of more than two miles. It is in moſt places ſhaded thickly with wood; and on one ſide very well broken with ſome old oaks, &c. that grow out of it. Almoſt in front of the houſe it leads to a *Gothic* bench, that is light and pleaſing. At each end it concludes in a ſhrubbery, which joins the houſe, and is in ſeveral inſtances very beautiful: a ſmall river winds through it, gently bounded by riſing hillocks, and ſmooth green ſlopes, very well varied, and ſpotted with ſhrubs and trees in a judicious manner. The bends of the water are natural, and the union with the lawn

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lawn and wood well imagined. To the right it ſeems loſt in the retiring grove. Theſe circumſtances are all executed with real taſte ; and if a few others were a little altered, the whole place would (in its ſtile) be complete. Among others, the looking from the lawn on to a bridge, which on croſſing, you find, has no connection with the water, the end of the river appearing full in view ;—this is not quite the thing.—The *chevaux de frize* pales, with part of the lawn from the paddock, are too near the water, they juſt cut a ſlip of mown graſs along the banks, which is a mere edging ; beſides the pales themſelves are ſeen, and that cloſe appearance of *art*, and *boundary*, hurts the effect of the river.—— Perhaps alſo, the benches in the walk are too frequent. As to the rock work grotto, it is (the lanthorn excepted) extremely well executed ; but in too wild a ſtile for a gentle ſtream, and a ſmooth ſhaven lawn ſpotted with ſhrubs ;—it requires a romantic ſituation on the banks of a rapid ſtream tumbling over broken fragments.

kept much cleaner.—And one application of this mode is particularly uſeful:—he ſows clover ſeed over his wheat or ſpring corn, juſt before the laſt hand-hoeing, which operation covers the ſeed in the compleateſt manner. I viewed the crops, and found the clover as regular as poſſible.

Mr. *Ducket*'s hedges are remarkably neat—they are of white-thorn only, very well plaſhed to ſecure them at bottom, and afterwards kept regularly clipped. The management of his borders, alſo, do him credit; he found them wide and quite over-run with buſhes and rubbiſh; all this he has grubbed up, ſo that the plough goes quite to the hedge—the fields are the neater, at the ſame time that much land is gained.

All the tillage of his land is performed with ploughs of his own invention: firſt, with a trenching one with two ſhares, &c. that work one below another, paring off the turf or ſurface of the land, and turning it over; the lower one follows in the ſame furrow, and raiſing freſh earth buries the firſt. In this manner it cuts 12 inches deep with 4 horſes, and does an acre a day. One very important uſe of this plough, is the burying twitch in ſand land. Mr. *Ducket*'s method, when his land is run much to twitch, is to bury it ſo deep as to admit the ſucceeding tillage *above* it; a large quantity of twitch buried, turns to excellent manure; but if not ſown with hoeing crops, it will not be deſtroyed; hand-hoeing with this management will totally deſtroy its growth; but while it is rotting, it holds the land together and is of great ſervice. This method Mr. *Ducket* finds to be far preferable to ploughing ſhallow, and truſting to the harrows for tearing out the twitch. The other is a trebble plough on one bent beam. It turns three furrows at once; works with 4 horſes, and does from 3 to 4 acres a day.

I ſhould give drawings of theſe moſt excellent implements, but the Regiſter of the Society at *London*, is about to publiſh a work which will include them.

They anſwer the purpoſe extremely well; and not only on ſand, but alſo on ſtiff ſoils, as I have been for ſome time a witneſs, in the fields of a gentleman whoſe huſbandry I ſhall preſently come to.—The trench plough coſts 8 *l.* 8 *s.*; and the trebble one 9 *l.* 9 *s.*

The method in which he drills his crops, of whatever ſort, is the following. The land, when ready for the ſeed, is harrowed flat; then the drills are ſtruck with a plough made on purpoſe.

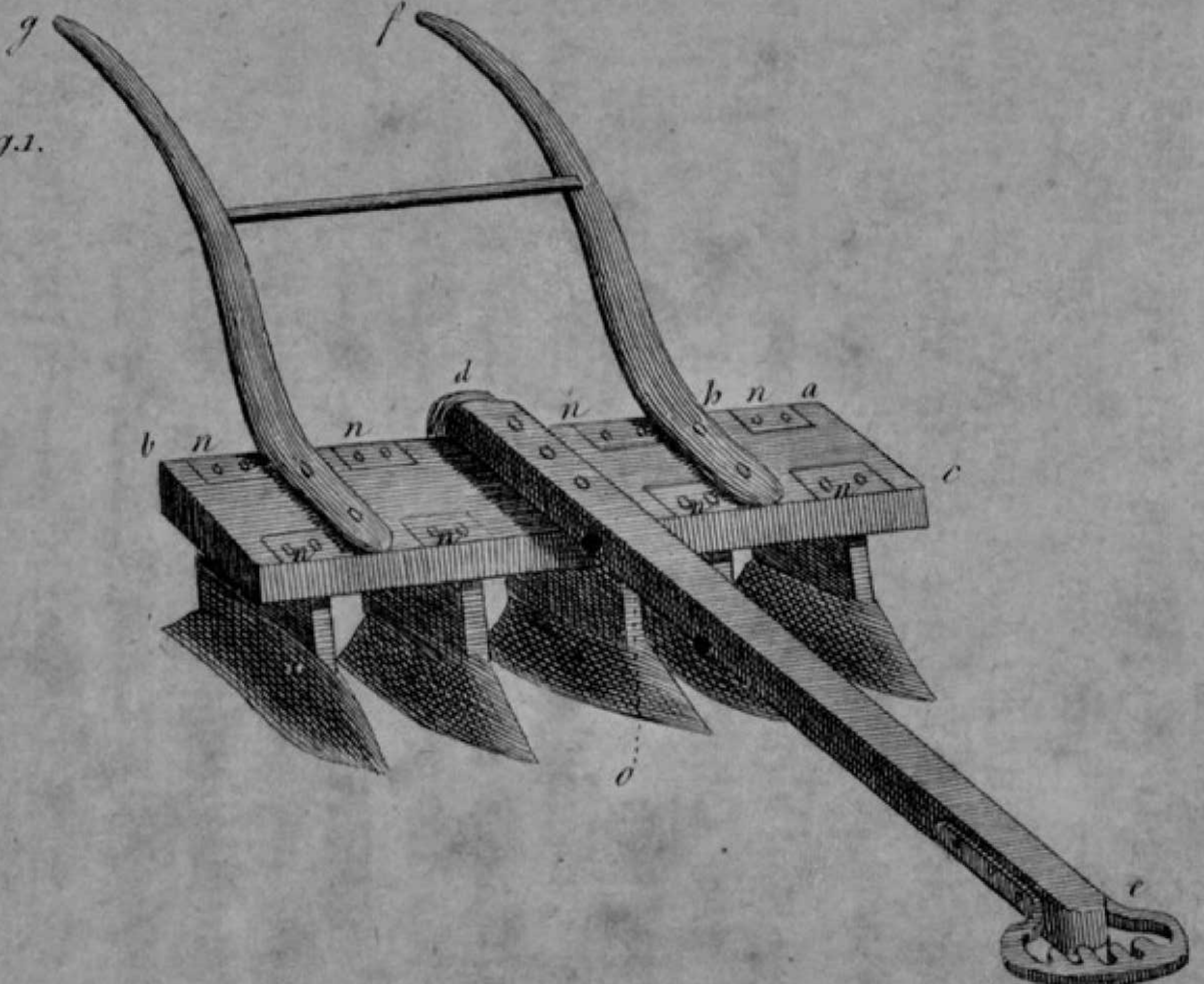
See Plate VIII. Fig. 1.

From a to b. —— 4 feet.
d — e. —— 5 ——
a — c. —— 0 8 inches.
f — h. —— 4 0
f — g. —— 2 4
e — o. —— 2 6
n. —— ſcrew holes to vary the diſtances of the ſhares. The bottoms of the ſhares in the ſhape of a boat, and ſhod with a narrow ſtrip of iron; they are 4 inches thick, and 12 high from the ground.

For the furrows to be ſtraight, the outward ſhare goes in the laſt furrow of the preceding ſet. When they are made, the corn, &c. are ſown broad-caſt, and the land harrowed; nine tenths of it riſe in the rows, and very regularly.—The price of it 3 *l.*

Plate VIII, Vol II, pa. 246.

Fig. 1.



Mr. *Ducket*'s beſt meadow on the banks of the *Thames* (an excellent one for cows) conſiſts at leaſt half the herbage of burnet: the reſt vernal, white clover—cow graſs—wild trefoile—and narrow leaved plantane.*

As to the common huſbandry about *Richmond* and *Peterſham*, it is difficult to give an account of it; the greateſt part of the country is occupied by the ſeats, gardens, and lawns of the nobility and gentry: the few farms here, riſe from 40 *l.* to 200 *l.* a year; in general about 60 *l.* 80 *l.* or 100 *l.* a year. The ſoil of two ſorts, either ſtiff loams,

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* RICHMOND Gardens have been lately altered: the terraſs and the grounds about it, are now converted into a waving lawn that hangs to the river in a moſt beautiful manner: the old avenue is broken, and the whole clumped in ſome places with groves; in others with knots of trees, and a very judicious uſe made of ſingle ones: no traces of the avenue are to be ſeen, though many of the trees remain. The lawn waves in a very agreeable manner, and the wood is ſo well managed, that the views of the river vary every moment. A gravel walk winds through it, which commands the moſt pleaſing ſcenes. The river, noble as it is, is not the only object that feaſts the eye; on the other ſide of the walk the grounds are thrown into ſuch various forms, that they no where fatigue the eye; in one place the lawn ſpreads over a moſt beautiful vale, and breaks among the woods, in a ſtile that muſt command attention; in ſome ſpots retiring into the groves, and contraſting its lively green with the darker ſhades of wood;—in others it ſwells into gentle hillocks ſcattered with ſingle trees, and riſes into a hill that compleats the inequality of

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of the ſpot: a flock of ſheep ſcattered about the ſlopes, add uncommonly to the beauty of the ſcene. It is, on the whole, a mild agreeable landſcape, which ſeems created by the hand of unpreſuming Taſte.

After this, the walk retires into thicker plantations, and winds through them with as much variety as the ground affords; the wild ſhrubby land is well managed, and contraſts the more dreſſed parts of the garden.

At *Kew* are many very fine exotic plants, with a great variety of trees not common.

The view from *Richmond* hill would figure in the fineſt parts of the north of *England*, where a bolder inequality of country preſents ſuch amazing ſcenes. The noble bend of the river at the foot of the hill, which preſents ſo fine a ſheet of water, is well contraſted by thick woods; and the iſlands give a ſtriking variety to the ſcene. The ſurrounding country is rich, and cut into innumerable incloſures; nor are there more houſes than ſufficient to throw a chearfulneſs over the whole; a fortunate circumſtance ſo near *London*. But the point of view being quite a town is very unhappy.

loams, tending pretty much to clay, or mere ſands; ſome of the latter do not let at more than 10*s.* or 12*s.* an acre; the meadows let at 40*s.*—the average of the neighbourhood, from 20*s.* to 25*s.*—As to the courſes of crops, they are as various as the private opinion of every farmer; but in general, they croud in crop upon crop as faſt as poſſible. Wheat and rye produce 3 quarters; Barley 4; Oats from 2 ½ to 10; the average 5; Tick beans, on their ſtrong land, 4 quarters. They hoe their turnips but once; and reckon the value 40*s.* to 3*l.* They mow much of their clover for ſoiling; it yields in hay, at two cuttings, 3 ½ loads.

LABOUR.

In harveſt, 2*s.* 6*d.* a day and board.

In hay-time, 2*s.* and beer.

In winter, 1*s.* 6*d.* to 1*s.* 8*d.*

Reaping, 7*s.* to 16*s.*

Mowing barley, [illegible] 6*d.* to 4*s.*

Mowing, making, carrying, and ſtacking hay, 10*s.* 6*d.*; but the farmer finds a loader.

Hoeing turnips, 6*s.*

Men's wages, 8 *l.* 8 *s.*

Lad's, 2 *l.* 10 *s.* to 4 *l.*

PROVISIONS.

Bread,	1 ¾ *d. per* pound.
Cheeſe,	4 ½
Butter,	9
Beef,	2 ½ *d.* coarſe joints.
Mutton,	4 ½
Veal,	5
Pork,	4 ¾
Bacon,	8
Milk,	1 *d. per* pint.

Houſe-rent, 5 *l.*

LETTER XVIII.

I Proceed to the regiſter of the experiments of *John Arbuthnot*, Eſq; of *Ravenſbury*, with the ſatisfaction of knowing that I ſhall lay before the public, as uſeful knowledge as was ever yet received in the walk of huſbandry. Their genuine merit renders any further introduction unneceſſary.

The moſt familiar method of arranging them will be under the following heads.

I. LAYING LAND TO GRASS.

II. THE CULTURE OF LUCERNE.

III. THE CULTURE OF MADDER.

IV. EXPERIMENTS ON THE DRILL CULTURE OF SEVERAL CROPS.

V. EXPERIMENTS TO ASCERTAIN THE BEST COURSE OF CROPS.

VI. MISCELLANEOUS EXPERIMENTS.

VII. IMPLEMENTS.

I LAYING LAND TO GRASS.

Experiment, No. 1.

In 1756, ſeventeen acres were laid down with oats, ſucceeding a ſummer fallow; the ſeeds uſed were,

2 Sacks *London* hay ſeeds;
20 *lb.* of white clover.

The two firſt years the product was very good, amounting to 2 loads an acre of hay; but it declined much afterwards. The graſſes that appeared, conſiſted chiefly of meadow poa—red robbin—ſome *dactilus*, or orchard graſs—and a ſmall proportion of ray-graſs. The white clover diſappeared quite, owing to the wetneſs of the land preventing its trailing branches ſtriking root. Four of theſe acres were hollow drained in 1766, which has gradually improved the herbage, inſomuch that thoſe parts in which the white clover died away, are now thickly covered with it.

Experiment, No. 2.

Mr. *Arbuthnot* has laid, at different times, 70 acres, in various methods:——firſt, 31 acres, with oats, on a ſummer fallow; the ſeeds,

20*lb*. of white clover;
10*lb*. of lucerne;
And 1 buſhel of ray-graſs.

This field, for two years after the firſt laying, produced 2 loads of hay *per* acre; but ſince that time (ten years ago) it has gradually diminiſhed. The white clover has diſappeared, except in dry patches, which has been owing to the wetneſs of the ſoil. After the firſt year, the lucerne has never made any appearance; but the ray-graſs has kept its ground.

The goodneſs of the crops the two firſt years, Mr. *Arbuthnot* attributes to the ſtaple of the ground being then pervious to the rain, and conſequently draining itſelf; but when the land ſubſided, the water was retained on the ſurface, to the deſtruction of the tender graſſes. The white clover is a plant that trails on the ground, but does not ſtrike root except in ſpots dry enough to admit it; which was the occaſion of the above-mentioned partial failure. Theſe 31 acres have ſince been drained by under ground cuts, which has brought the white clover in much greater abundance.

In 1766, it was manured at the rate of 30 loads an acre with river mud, in which were many ſmall ſhells. No benefit was ſeen the firſt year; which he attributes to the ſervant having injudiciouſly rolled it with an heavy roller in the ſpring when too wet: this manuring was before the draining; the mud took no effect till after that operation.

In the wetteſt parts of the field there appeared a very pernicious graſs called red robbin; in arable land, the *Surry* farmers call it water-graſs: it is there very difficult to extirpate; for though only fibrous rooted, yet burying will not deſtroy it; it muſt be extracted like couch: in graſs land it comes very late, and yields nothing.

Experiment, No. 3.

Ten other acres were likewiſe ſown with oats on a fallow; the ſeeds, 2 Sacks of hay ſeeds from the Horſe Guards, chiefly conſiſting of creſted dog's tail—narrow leaved plantane—barley graſs—and innumerable daiſies.

20 *lb.* White clover.

This field has continued a good paſture, without declining like the preceding ones; but it has not produced a good burthen of hay. The reaſon of its not falling off after the ſecond year like the reſt, is the ſoil being a black loam, which does not ſubſide into ſo retentive a maſs as the other wetter an ds. The product of the hay being but ſmall, aroſe from moſt of the above mentioned graſſes running chiefly to bents, inſtead of thickening on the ground like many other ſorts.

Experiment, No. 4.

Seven acres more were ſown with tares; the ſtubble ploughed up and hollow drained; oats thrown in at ſpring, and with them 2 ſacks an acre of *Suffolk* hay ſeeds, and 20*lb.* white clover. The whole was manured after the oats were off. This has proved a good paſture ever ſince, and has yielded large crops of hay, but the graſs has conſiſted chiefly of the *holchus*, believed to be a very bad ſort—ſome *dactilus*—a ſmall quantity of meadow feſcue—and a little meadow fox tail, and great poa;—and it is remarkable that no vernal has appeared.—This field has remained quite dry ever ſince, even in the depth of winter—though the ſame ſoil undrained has been too wet for cattle to ſtir on.

Obſervation.

Mr. *Arbuthnot* remarking that ray-graſs generally run to ſeed before the white clover made any bottom in the ſpring, and eſpecially on land undrained; he has uſually fed the paſture until the end of *May*, and then laid it by for hay. This conduct has given the white clover time to bottom, ſo that he has often mown a load of hay an acre on land, which, in other management, would not near equal the produce. A hint that may prove very uſeful to many cultivators;—for feeding ray graſs late in the ſpring without damaging the crop of hay, is a very great acquiſition in ſheep feed.

II. LUCERNE.

Experiment, No. 5.

In the year 1759, twelve acres of a black, deep, ſandy loam were ſown with barley, after turnips, and with it 10 *lb.* *per* acre of lucerne broad-caſt. The corn was mown and carried; but nothing done to the lucerne.

1760.

This year it was mown for ſoiling horſes, &c. but the produce weak; not conſiderable enough for a particular valuation.

1761.

This year the crop came to perfection. Early in the ſpring it was croſs ploughed with a round ſhare, and harrowed. Mowed it thrice, each time for hay; the product of the three, four tons *per* acre of the beſt hay ever uſed. The team men would not at firſt uſe it; but they were at laſt ſo prejudiced in its favour, that when done, they lamented the loſs. After the mowings, there was an aftermath, which yielded ſome food for cows and ſheep. Between each cutting it was harrowed; and likewiſe in autumn. The average price of common hay is 45*s.* a load; but Mr. *Arbuthnot* valued this of lucerne at 55*s.*; in which valuation his men agreed.

1762.

This year the culture was the ſame as the preceding, and alſo the crop; it was again mown thrice.

1763.

The ſame culture and product: a latter growth the end of *September* was cut off in one night by a ſlight froſt: hardy as the plant in general is, yet the ſhoots are extremely tender; they will bear no froſt. The natural graſs made ſo formidable an appearance, that the autumnal harrowing was omitted, from an idea that it would be ineffectual.

1764.

In the ſpring of this year, one acre was ploughed up and planted with madder; the remaining eleven were mown twice, but had no harrowing; the product 44 tons of dry hay; but more than half was in the firſt crop, and much of it natural graſs.

1765.

In this ſpring, ploughed it up for madder; the lucerne declined, owing, as apprehended, to a want of more regular and ſevere harrowing, as it has been found that the ſevereſt operation of that ſort will not damage the plants. *Rocque*'s harrow was uſed.

In reſpect to making it into hay; the lucerne is ſo ſtalky that it does not ſettle ſoon; it was therefore ſtacked very green —the heat that reſults from ſap (not wet) is beneficial. It was always cut as ſoon as there appeared a general ſcattered bloom.

Expences and Produce.

1760.	Rent, - -	£. 1	0	0
	Tythe and town charges,	0	6	0
	Three ploughings -	0	13	6
	Seed and ſowing, -	0	12	0
	Three harrowings, -	0	4	6
	Mowing, &c. -	0	5	0
		3	1	0
	By green food, -	1	0	0
	Loſs, - -	2	1	0

1761.	Rent, &c. –	£. 1	6	0
	Ploughing, – –	0	4	6
	Four harrowings, –	0	6	0
	Mowings; firſt, –	0	3	0
	ſecond, –	0	1	6
	third, –	0	1	6
	Making, raking, carting, and ſtacking thrice,	1	0	0
		3	2	6
	By 4 loads of hay, at 55s. – –	11	0	0
	After-graſs, –	0	5	0
		11	5	0
	Expences, –	3	2	6
	Clear profit, –	8	2	6
1762.	The ſame as in 1761:			
	Product, – –	11	5	0
	Expences, –	3	2	6
	Profit,	8	2	6
1763.	Rent, &c. – –	1	6	0
	Three harrowings, –	0	4	6
	Mowing, – –	0	6	0
	Making, &c. –	1	0	0
		2	16	6

	By 4 loads of hay,	£.11	0	0
	Expences, –	2	16	6
	Clear profit, –	8	3	6
1764.	Rent, &c. – –	1	6	0
	Mowing twice, –	0	4	6
	Making, &c. –	0	15	0
		2	5	6
	By 4 loads of hay, –	11	0	0
	Expences, –	2	5	6
	Clear profit, –	8	14	6
1761.	Profit, – –	8	2	6
1762.	Ditto, – –	8	2	6
1763.	Ditto, – –	8	3	6
1764.	Ditto, – –	8	14	6
		33	3	0
1760.	Loſs, – –	2	1	0
	Profit in 5 years, –	31	2	0
	Which is *per* acre *per ann.*	6	4	4
	And on the 12 acres,	74	12	0

Wheat, to equal this profit, muſt yield 5 quarters an acre, and that *every* year. If this does not prove the vaſt profit of lucerne; nothing can. Nor ſhould we condemn for laſting no longer a graſs that will continue four years in ſuch full perfection. In other methods of culture it has remained much longer—but that is not the leaſt reaſon for rejecting a ſhorter duration. Such a culture may poſſibly be found more beneficial than the more laſting, and at the ſame time more expenſive modes;—for ſuch a term of five years, in a courſe of ſeveral crops, will be found uncommonly profitable.

Mr. *Arbuthnot*, from the experience of this crop, as well as more general obſervation, recommends the broad-caſt culture of lucerne intended for hay, becauſe it is neceſſary that the ground ſhould be quite covered with plants, to prevent the dirt or duſt ſticking to the hay. But if it is deſigned for ſoiling, then he recommends drills equally diſtant, 18 inches aſunder. It is abſolutely neceſſary to harrow it croſs and croſs in both ſpring and autumn; it ſhould be done till the land has the abſolute appearance of a fallow, and alſo be manured every autumn, before the harrowing, with fine rotten compoſt. The ſpring harrowing as early as the ſeaſon will admit; if the young ſhoots ſpring before you can get on, do not therefore deſiſt from harrowing; you had better deſtroy them totally than omit that operation, which is eſſential to the goodneſs of the crop.

Experiment, No. 6.

In order to determine in what degree lucerne will bear very rough treatment, this gentleman wounded many plants in a ſevere manner, quite to mangling them—others he cut off 3 inches below the ground; the reſult was, that the latter plants were abſolutely killed, but the former not in the leaſt hurt: the fact is, that the bulb may be wounded in any degree; if the leaſt bit remains it ſprouts preſently; but cut it quite off, and you deſtroy the plant.

III. THE CULTURE OF MADDER, &c.

Mr. *Arbuthnot*, on his applying to huſbandry, formed a general idea of the means of rendering it profitable. It appeared to him that common crops managed in a common manner, could not to a gentleman yield the ſame advantage as to men who attend to the loweſt minutiæ of the buſineſs, and live as much by frugality as agriculture. In ſuch a ſtile of huſbandry he thought it not deſirable to emulate them, but rather to apply to the culture of ſuch rich vegetables, as would yield a profit conſiderable enough to pay for an accurate expenſive culture, which would not only be more beneficial, but at the ſame time require much leſs trouble and fatigue——and not be liable to the numerous caſualties and impoſitions to which common crops are ſo univerſally open.

Among other plants, MADDER attracted his attention, as an article of culture that has as few objections to it as moſt others——it remains ſeveral years in the ground, conſequently is leſs complex in its management than ſuch annual ones as hops——it is liable to few accidents——and pays excellently for a perfect culture: large quantities being conſtantly imported from *Holland* to anſwer our own demand, and the *Dutch* growing moſt of it themſelves, and having by monopoly raiſed it to a moſt extravagant price, he determined with the ſpirit which real prudence dictates, to take a journey into *Flanders* to examine the ſoil there preferred for madder, and their management of the crop. Afterwards, in a journey through *Holland*, he alſo made enquiries into the conduct of the crops, and the method of manufacturing it; having obtained admiſſion into their ſtoves, where he found a management more expenſive, but no ways preferable to what is practiſed by many in *England*; this he did that he might enter upon the culture himſelf, with that knowledge of the buſineſs which was requiſite for avoiding great errors. Ill ſucceſs in ſuch purſuits, is more often owing to haſty, premature attempts, than to really natural obſtructions —It is oftener the moral, than the phyſical capability that is wanting.

During his ſtay in *Holland*, he examined their madder grounds with the minuteſt attention; made every requiſite enquiry for gaining as complete a knowledge of the culture as poſſible—and from thence was convinced of the propriety of attempting it at home. He took the opportunity of being in that country, to make himſelf further acquainted with huſbandry in general. He travelled through all the provinces, and likewiſe that region of good huſbandry, FLANDERS, and being perfectly acquainted with the *Dutch* and *French* languages, he was able to gain whatever information he wanted; accordingly he has introduced ſeveral practices on his own farm, the hint of which he caught in *Flanders*.

Experiment, No. 7.

He began his undertaking with trying one acre in the year 1765. The ſoil a deep black loam. It was dug 18 inches deep in *March*, and planted with winter plants—that is, with parts of the runners and crown of the root on which the buds are made for that year's growth. The rows were equally diſtant, 18 inches aſunder, and 6 inches from plant to plant. As ſoon as the ſhoots were 10 inches high, the plantation was hand-hoed; which operation was repeated twice more during the ſummer, ſo as to keep the land quite free from weeds.

1766.

In the ſpring of this year, as ſoon as the ſhoots appeared, they were earthed up with hand-hoes; and when 8 inches high, they were moſt of them drawn for planting other land; after which the rows were earthed again: as ſoon as the freſh ſhoots were 8 inches high, they were drawn again —and after another earthing, the ſame for the third time. In autumn the beds were earthed again, and the haulm that remained, buried, by digging earth in the intervals and ſpreading it on the rows.

1767.

In this ſpring, plants were once drawn off and earthed as in laſt year; alſo hand-hoed twice. In autumn the crop was dug up with ſpades, and the madder clean picked: but the produce not exceeding 10*l.* value; which was owing to the great damage the plants received from having ſetts ſo often drawn from them.

Expences.

1765.	Firſt digging, -	£. 8	0	0
	Planting, - -	1	1	0
	Plants, - -	15	0	0
	Hand-hoeing thrice, -	1	10	0
1766.	Hand-hoeing; thrice earthing at the ſame time, - -	1	10	0
	Carry over -	27	1	0

	Brought over,	£.27	1	0
	Digging the intervals,	1	0	0
1767.	Hand-hoeing thrice,	1	10	0
	Taking up, –	8	0	0
	Three years rent, tythe and town charges, at 1 *l.* 6 *s.* – –	3	18	0
	Total expences,	41	9	0
	Produce.			
	Value of the crop, –	10	0	0
	Loſs, –	31	9	0

The balance is here called loſs; and improperly, becauſe this acre was but a nurſery for ſucceeding crop ; the value of the plants drawn from it, amounted to 90*l.*; it ſhould here, therefore, be eſteemed the mere price of the ſets for the ſucceeding plantations.

From this experiment two very uſeful facts are gained: firſt, the expence of cultivation by digging, where no manure is wanting, and the plants not purchaſed, amounts, on land of 20*s.* to 26*l.* 9*s.* *per* acre, including the expence of twice digging; but if the ſame ground was again planted, the total would of courſe be leſs.

Hence we find, that 6 *C. wt.* of madder, at 4*l.* a *C. wt.* will pay the expence of ſuch cultivation.

Another circumſtance of great conſequence, is the damage the crop received by drawing plants from it—even to the total deſtruction of the profit. This offers a leſſon for the cultivators of madder, not to be free in taking plants from their crops.—If their plantations are annually increaſing, all may poſſibly be ſpoiled by drawing: does it not therefore ſeem expedient to leave part * of the crop, enough as you judge for a ſupply of plants till the ſpring planting is over, and then take it up inſtead of the autumn preceding.

Experiment, No. 8.

Seven acres of a ſandy loam (a barley ſtubble) was ploughed at *Michaelmas* with a ſtrong wheel plough, 14 inches deep. Upon this ploughing it was manured with 10 loads (40 buſhels each) an acre of farm-yard manure, which was turned in by landing up for the winter on to 3 feet ridges.

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* One acre of very good madder will yield plants enough for ten.

1766.

The beginning of *March* ploughed it again; reverſing the ridges thrown up the preceding autumn. The ſame month they were planted with winter * plants, a ſingle row on each ridge; the plants 18 inches aſunder. The method uſed in planting was to draw furrows with hand-hoes, and then the ſets were laid in them, and covered alſo by hoes. Moſt part of the field miſcarried; owing to an unuſual quantity of rain falling, and the ſpring ploughing being given while the land was wet. The whole was therefore ploughed up, and in *May* it was again planted with ſpring plants, bought at 8*s.* *per* thouſand;

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* Winter Plants, are that part of the root on which the eyes are made; which are cut in lengths of 2 or 3 inches, in the ſame manner as hop plants.

Mr. *Arbuthnot* does not approve their uſe, becauſe they remain ſo long in the ground that they are ſubject to rot, eſpecially if it be moiſt: and this he attributes to their wanting the ſupport of fibres which they had when on the mother plant; and though from their great ſucculency they will vegetate, yet they are very ſubject to decay from moiſture.

the rows 2 feet by 18 inches; which is 15000 *per* acre; they were dibbled in. During the ſummer, the plants were kept clean by three hand-hoeings; and in the autumn the rows were covered by earth dug in the intervals.

1767.

This year the field was hand-hoed twice.

1768.

And again the ſame in 1768. In autumn it was ploughed up with the great wheel plough, to the depth of 18 inches, with 12 horſes. Men followed the plough with pronged forks to throw the madder out of the furrows, and women and children followed to pick it up. The produce 4 tons 4 *C. wt* on the 7 acres, at 4*l.* 10*s.* *per C. wt.*

Expences per acre.

1765.	Firſt ploughing, –	£.1	4	0
	Manuring, –	3	10	0
	Landing up, –	0	7	6
1766.	Spring ploughing –	0	7	6
	Planting, – –	1	0	0
	Ploughing up, –	0	7	6
	Planting the ſecond time,	1	10	0
	The plants, –	6	0	0
	Carry over, –	14	6	6

	Brought over,	£.14	6	6
	Three hand-hoeings,	1	10	0
	Digging in autumn,	0	10	0
1767.	Two hand-hoeings, -	1	0	0
1768.	Ditto, - -	1	0	0
	Taking up, all expences included, -	7	0	0
	Drying, at 3*s.* *per* *C. wt.*	1	16	0
	Three years rent, tythe and town charges, at 22*s.* - -	3	6	0
	Total, - -	30	8	6

Produce.

12 *C. wt.* of madder, at 4*l.* 10*s.* - -	54	0	0
Expences, -	30	8	6
Clear profit, -	23	11	6
Or *per annum*,	7	17	2
Product of the 7 acres,	378	0	0
Ditto expences,	212	19	6
Ditto profit, -	165	0	6
Or *per annum*,	58	6	10

Obſervations.

Near 8 *l.* expence *per* acre was here incurred by accident; ſo that the profit, with better fortune, would have been above 30 *l.* an acre: and this ſuppoſition is not to be ſlighted, as Mr. *Arbuthnot* candidly owns it to have ariſen from an error in ploughing when the land was too wet. However, to take the fact as it really happened, the profit is very conſiderable: 7 *l.* 17 *s.* 2 *d. per* acre *per annum*, much exceeds what can be gained from any common huſbandry: 5 quarters *per* acre of wheat gained every year (which by the way is an impoſſibility) will not equal this amount; at the ſame time that conſtant crops of that grain, would be without compariſon more hazardous and troubleſome: a ſtrong proof of the juſtneſs of this gentleman's idea of the propriety of adopting uncommon articles of culture.

Plants were drawn from this crop, but not in abundance.

Experiment, No. 9.

Nine other acres of the ſame ſoil were ploughed 14 inches deep at *Michaelmas*

1765, and dunged with 10 loads an acre of yard dung; covered by landing up.

1766.

In the ſpring it was planted with ſpring plants, dibbled in rows 2 feet aſunder, by 18 inches from plant to plant; and kept clean through the ſummer by three hand-hoeings: and in autumn the furrows were dug, and the earth thrown over the plants.

1767.

This year it was kept clean by two hand-hoeings.

1768.

In *February*, a large compoſt, conſiſting of farm-yard dung and ſome aſhes, laid on the headland and mixed well with a large quantity of virgin earth, was ſpread on the land, and in the ſummer it was hand-hoed twice. In autumn it was ploughed up, to the depth of 18 inches; and the crop when dry amounted to 12 *C. wt. per* acre, at 4 *l.* 10 *s.*—But three lands, of 3 rows each, were left for a further growth of three years longer, by way of experiment, to diſcover the increaſe of the root in ſtanding three years extraordinary.

Expences.

1765.	Ploughing, -	£. 1	4	0
	Manuring, -	3	10	0
	Landing up, -	0	7	6
1766.	Spring earth, -	0	7	6
	Planting, -	1	0	0
	Three hand-hoeings -	1	10	0
	Autumnal digging, -	0	10	0
1767.	Two hand-hoeings, -	1	0	0
1768.	Manuring, -	4	0	0
	Two hand-hoeings,	1	0	0
	Digging up, -	7	0	0
	Drying, at 3*s*. a *C. wt.*	1	16	0
	Three years rent, &c.	3	6	0
		26	11	0

Produce.

12 *C. wt.* of madder, at 4*l.* 10*s.*	54	0	0
Expences,	26	11	0
Clear profit, -	27	9	0
Or *per annum*,	9	3	0

Product of the nine acres, - -	486	0	0
Ditto expences,	238	19	0
Ditto profit, -	245	1	0
Or *per annum*,	81	13	8

Obſervations.

It is to be remarked on this crop, that the produce does not exceed that of Experiment, No. 8, notwithſtanding the laſt year's manuring at the expence of 4*l.* an acre; it is true that the firſt planting of it ſucceeded, which might perhaps be a matter of conſequence in gaining time before the ſummer heats came on; not however to the amount of balancing a manuring of 4*l.*: it ſhould therefore ſeem that the manure ought to be ſpread on the land before planting, or at leaſt long before the laſt year of the crop, for then the plants have not time to avail themſelves fully of the advantage. The plants, Mr. *Arbuthnot* remarks, on this crop were too far aſunder, and the laſt dunging did not anſwer; as by earthing, it drew up ſhoots, that ſhewed the appearance of great increaſe, when the crop was taken up; but thoſe tops being more ſucculent than the other part of the root, they withered in proportion to their ſucculency.

The profit is very conſiderable: 9*l.* 3*s.* *per* acre clear, is ſuch a degree of advantage as can never be expected in any common huſbandry: make it as perfect as you pleaſe, it will never arrive at ſuch a height.

Experiment, No. 10.

In 1766, nine acres were fallowed, receiving in all ſix earths: the firſt, 14 inches deep, and landed up in autumn by the laſt, being at the ſame time thrown on to 4 feet ridges.

1767.

In the ſpring it was manured at the rate of 5 ſacks *per* acre of wood-aſhes, and 5 quarters *per* acre of trotters; and the whole covered by reverſing the ridges. It was then planted with dibbles: 6 acres, one row on a land; 2 ½ acres two rows on a land; and ½ an acre, one row on 2 feet lands. Theſe variations were made by way of trial, to diſcover the moſt profitable method of planting. The ſets in each, one foot aſunder.

This ſummer the rows were hand-hoed three times; and many hard clods being tumbled, by the firſt hoeing, into the furrows, they were cruſhed in pieces by a ſmall ſpiky roller; an implement uſed by Mr. *Arbuthnot*. The intervals were horſe-hoed thrice with a ſhim, which cuts the land and weeds, but does not bury them. After each ſhimming, followed another implement; the double mould-board plough, with moveable earth-boards expanding at pleaſure: this machine ſtrikes the looſe earth from the furrows, which was raiſed by the ſhim earthing up the beds. Theſe operations were the ſame to all, except the half acre planted on narrow lands, which could only be hand-hoed. In autumn the furrows were again ſtruck with the double mould-board plough.

1768.

This year the beds were hand-hoed thrice, and the furrows ſhimmed three times; followed each time, as before, with the double mould-board plough. On the laſt hand-hoeing, two acres were ſown with weld, as the madder plants ſtood thin on theſe acres. The furrows in autumn ſtruck, as before, with the double mould-board plough.

1769.

This year the rows were hand-hoed twice; and the furrows ploughed with the ſhim and double mould-board plough thrice; but none of theſe operations to the two acres where the weld was ſown. In *July* the weld was pulled; and in *October* the madder taken up with the great plough; laying two lands into one.

The products were as follow.

No. I. On the half acre, ſingle rows on 2 feet lands, 6 *C. wt.*

No. 2. On the ſix acres, ſingle rows on 4 feet lands, 8 *C. wt. per* acre.

No. 3. On the 2 ½ acres, double rows on 4 feet, 10 *C. wt. per* acre, and 72 *l.*'s* worth of weld on the two acres—but the half acre, where no weld grew, was the beſt part.

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* *N. B.* Weld was this year 12 *l.* a load.

Account of No. 1.

Proportions *per* acre.

Expences.

1766.	Five ploughings, at 7*s*. 6*d*.	£.1	17	6
	One deep ditto,	0	17	0
1767.	Five quarters of trotters,	3	0	0
	Five ſacks of wood aſhes,	0	12	6
	Ploughing,	0	7	6
	Planting,	1	5	0
	Three hand-hoeings,	1	10	0
	Striking furrows,	0	1	2
1768.	Three hand-hoeings,	1	10	0
	Striking furrows,	0	1	2
1769.	Two hand-hoeings,	1	0	0
	Taking up the madder,	5	10	0
	Drying, at 3*s*.	1	16	0
	Rent, tythe; and town charges, four years,	4	8	0
		23	15	10

Produce.

12 *C. wt.*, at 4*l*. 10*s*.	54	0	0
Expences,	23	15	10
Clear profit,	30	4	2

Account of No. 2.

Expences.

1766.	Five earths, at 7 *s.* 6 *d.*	£. 1	17	6
	One deep ditto, –	0	17	0
1767.	Trotters and aſhes, –	3	12	6
	Ploughing, – –	0	7	6
	Planting, – –	1	0	0
	Three hand-hoeings, –	1	10	0
	Rolling furrows with ſpiky roller, –	0	0	8
	Horſe-hoeing with ſhim thrice, at 8 *d.* –	0	2	0
	Ditto double mould-board plough, four times, at 1 *s.* 2 *d.* –	0	4	8
1768.	Three hand-hoeings –	1	10	0
	Shimming thrice, –	0	2	0
	Double mould board plough, four times,	0	4	8
1769.	Two hand-hoeings, –	1	0	0
	Shim thrice, –	0	2	0
	Double mould-board plough, – –	0	4	8
	Taking up, –	5	10	0
	Drying, at 3 *s.* –	1	4	0
	Four years rent, &c.	4	8	0
		23	17	2

Produce.

	£.	s.	d.
8 *C. wt.* at 4*l.* 10*s.*	£.36	0	0
Expences, -	23	17	2
Clear profit,	12	2	10

Account of No. 3.

Expences.

1766.	Ploughing as before, -	2	14	6
1767.	Trotters and aſhes, -	3	12	6
	Ploughing, - -	0	7	6
	Planting, - -	1	5	0
	Hand-hoeing, and horſe-hoeing as in No. 2.	1	17	4
1768.	Ditto, - -	1	16	8
	Weld, ſeed and ſowing,	0	1	6
1769.	Pulling, &c. the weld,	1	10	0
	Taking up the madder,	5	10	0
	Drying, at 3*s.* -	1	10	0
	Four years rent, &c.	4	8	0
		24	13	0

Produce.

10 *C. wt.* Madder, at 4*l.* 10*s.* - -	45	0	0
Weld, - -	36	0	0
	81	0	0
Expences, -	24	13	0
Clear profit, -	56	7	0

Suppoſing the weld not ſown, the account would be;

Madder, - -	£.45	0	0
Expences, -	23	1	6
Clear profit, -	21	18	6

Compariſon.

Single rows on 2 feet lands,	30	4	2
Double rows on 4 feet lands,	21	18	6
Superiority of the former,	8	5	8
Single rows on 2 feet lands,	30	4	2
Single rows on 4 feet lands,	12	2	10
Superiority of the former,	18	1	4
Double rows on 4 feet lands,	21	18	6
Single rows on ditto, -	12	2	10
Superiority, -	9	15	8
Profit *per* acre *per annum* on the ſingle rows on 2 feet, -	7	11	0½
Ditto on the double rows at 4 feet, - -	5	9	7½
Ditto on the ſingle rows at 4 feet,	3	0	8½
Ditto on the madder and weld,	14	1	9

Total of the nine acres.

Expences.

Half an acre of No. 1. -	11	17	11
Six acres of No. 2. -	143	3	0
Half an acre of No. 3 without weld, - - -	11	10	9
Two acres of ditto with weld,	49	6	0
	215	17	8

Produce.

No. 1. Half an acre, -	27	0	0
No. 2. Six acres, -	216	0	0
No. 3. Half an acre, -	22	10	0
Ditto two acres, - -	162	0	0
-	427	10	0
Expences, -	215	17	8
Clear profit, -	211	12	4
Which is, on an average, *per* acre, - -	23	10	3
And *per* acre *per ann.* -	5	17	6

Obſervations.

The great profit in this experiment is by the ſowing weld on the madder; but in conſidering the culture of the latter plant, this circumſtance ſhould be thrown out of the account; the madder was however damaged by it, and the weld would have been as good a crop had no madder been on the ground, and probably a better. But a product by weld of 36*l.* an acre, for only 2 years, (ſuppoſing a fallow) and the culture not expenſive, appears to be an object of capital importance: Probably not many madder crops will pay better.

In the compariſon between the modes of culture, ſomething ſhould be allowed to No. 3 on account of the damage ariſing from the weld.

It is extremely evident, that the nearer the rows, the greater the crop—at leaſt to the proximity of 2 feet equally diſtant. Single rows at 4 feet, are not half ſo advantageous, which is very remarkable. Two rows on 4 feet are almoſt doubly more beneficial than the ſingle ones; but though two rows on a 4 feet land amount in the whole to the ſame as equally diſtant at 2 feet, yet do they not near equal them in product; from which it ſhould ſeem that the plants ſhould be ſpread pretty equally over the land. If madder is obſerved in the taking up, it will be found that the principal produce is the large roots which ſhoot immediately from the crown; take a cubical foot of land ſurrounding one plant, there will be much more crop in that ſpace, than in half as much again, or perhaps double the ſpace next adjoining; which ſeems to account for rows equally diſtant 2 feet, being better than 2 on 4 feet. How much of the ſuperiority is to be attributed to the horſe-hoeing on both ſides the rows, cannot be decided from this trial.

The profit clear of 7*l.* 11*s.* 0*d.* ½ *per* acre *per ann.* on the beſt crop, is extremely advantageous, and much exceeding the groſs *product* of the beſt common huſbandry. The ſame obſervation is almoſt as applicable to the 5*l.* 9*s.* of the double rows. But the 3*l.* *per* acre on the ſingle rows may be exceeded by common crops.

The profit of the weld and madder, 14*l.* an acre, is great; and certainly demands the attention of all who may have crops in the ſame ſituation, more particularly as it has been the general opinion that ſuch land was not proper for that vegetable.

Experiment, No. 11.

Four acres of an old lay were ploughed up at *Michaelmas* 1765, fourteen inches deep; the ſoil a deep ſandy loam.

In 1766 it was fallowed; receiving four earths, the firſt of which was alſo 14 inches deep. In autumn it was landed up.

In ſpring 1767, manured it with 3 quarters of trotters and 75 buſhels of lime *per* acre; which were turned in by ploughing down on to 4 feet lands. It was then planted with dibbles, 2 rows on each land, at one foot aſunder. The whole was deſtroyed by the ſod or wyer worm; which miſcarriage was owing to its being an old lay.

Expences.

1765.	Firſt ploughing, –	£.0	17	0
1766.	Ditto. – –	0	17	0
	Three common earths,	1	2	6
	Landing up, –	0	7	6
1767.	Trotters, 3 quarters, –	1	13	0
	75 buſhels lime, at 9*d*.	2	16	3
	Ploughing down, –	0	7	6
	Planting, – –	1	5	0
	Two years rent, –	2	4	0
		11	9	9

The planting and the value of the ſetts are the only charges here to be carried to the account of madder; the tillage and manuring being ſo much value in the land for other crops. The field was ploughed up and ſown with turnips.

This experiment ſhould be a laſting warning againſt ever planting madder on new land, for moſt of it is full of this ſod worm, and it is plain that one year will not deſtroy them: Land ſhould be thrown into one round of crops before the madder is planted; in that time the worm's food will be deſtroyed, and no danger conſequently remain.

Experiment, No. 12.

Four acres of the ſame ſoil as No. 11. were followed through the year 1766, receiving 5 common ploughings, and one of 12 inches deep, and afterwards landed up in 4 feet ridges. In the ſpring of 1767 it was manured with 3 quarters of trotters and 4 ſacks of wood-aſhes *per* acre, and turned in by a common ploughing: it was then planted with dibbles; one row on each land, the ſets one foot aſunder; and that ſummer hand-hoed thrice; ſhimmed thrice; the furrows ſtruck with double mould-board plough four times; and the clods broken by ſpiky roller once.

In 1768 it was hand-hoed thrice again; alſo ſhimmed thrice; and ſtruck four times. In 1769 hand-hoed twice; and ſhimmed and ſtruck as often, ploughed up, the crop 12 *C. wt. per* acre, at 4*l*.

Expences.

1766.	Five ploughings, -	£.1	17	6
	One ditto 12 inches deep,	0	17	0
	Landing up, -	0	7	6
1767.	Manuring with trotters, 3 quarters, -	1	16	0
	4 Sacks aſhes, -	0	8	0
	Ploughing, - -	0	7	6
	Planting, - -	1	5	0
	Three hand-hoeings,	1	10	0
	Rolling, - -	0	0	8
	Shim thrice, -	0	2	0
	Double mould-board plough four times,	0	4	8
1768.	Three hand-hoeings,	1	10	0
	Carry over, -	10	5	10

	Brought over,	£. 10	5	10
	Shim thrice, -	0	2	0
	Double mould-board plough four times,	0	4	8
1769.	Two hand-hoeings, -	1	0	0
	Shim twice, -	0	1	4
	Double mould-board plough ditto, -	0	2	4
	Taking up, -	5	10	0
	Drying, - -	1	16	0
	Four years rent, &c.	4	8	0
		23	10	2

Product.

12 *C. wt.* at 4 *l.* -	48	0	0
Expences, -	23	10	2
Clear profit, - -	24	9	10
Or *per* acre *per ann.*	6	2	5½
Product of the 4 acres	192	0	0
Ditto expences,	94	0	8
Profit, -	97	19	4

Obſervations.

If the remark made in Experiment, No. 11. be juſtly founded, this field was planted in a diſadvantageous manner; and yet we find it produce a crop ſufficient, at a low price, to pay more than 5*l.* an acre clear profit, which I need not remark is more than common huſbandry can yield: It appears therefore very plainly from every view we can take of madder, that it much exceeds the farmer's culture.

Experiment, No. 13.

Six acres of deep black loam were trench ploughed from lucerne in *March* 1767, with *Ducket*'s trenching plough, 14 inches deep, and on that ploughing planted with madder in equally diſtant rows, 4 feet aſunder. It was that ſummer hand-hoed thrice; the intervals ploughed with the ſhim and double mould-board plough thrice; and in autumn the furrows were ſtruck with that implement, and the rows earthed with hand-hoes.

1768.

In this ſpring plants were drawn from it four times. It was in ſummer hand-hoed four times; horſe-hoed as before, thrice; and the furrows ſtruck in autumn.

This ground was deſtined for a nurſery,

being of looſe texture, admitting the plants to be eaſily drawn, which in ſtronger land is very troubleſome and prejudicial to the crop, as many break off ſhort, and the roots ſubject to be much injured by the inſtrument which muſt neceſſarily be uſed in ſuch land for taking up the plants.

1769.

Plants were again taken from it this ſpring as often as the laſt. The horſe and hand-hoeing the ſame as before.

1770.

The crop came in courſe to be taken in autumn 1769, but it had received ſo much damage by having plants drawn from it, that Mr. *Arbuthnot* determined to let it ſtand for drawing more from it in the ſpring of 1770, rather than damage another crop as well as this. It was therefore earthed up twice in the ſpring, and had plants drawn from it as long as the planting ſeaſon laſted. In *Auguſt* taken up; crop 2 *C. wt. per* acre.

Expences.

1767.	Trench ploughing,	£. 0	16	0
	Planting, - -	1	0	0
	Three hand-hoeings,	1	10	0
	Shim thrice, -	0	2	0
	Double mould-board plough thrice, -	0	3	6
	Ditto ſtriking furrows,	0	2	6
	Earthing up, -	0	5	0
1768.	Four hand-hoeings, -	2	0	0
	Shim thrice, -	0	2	0
	Double mould-board plough thrice, -	0	3	6
	Ditto ſtriking furrows,	0	2	6
1769.	The ſame as 1768, -	2	8	0
1770.	Hand-hoeing twice,	1	0	0
	Twice earthing, -	0	10	0
	Taking up, -	4	0	0
	Four years rent, (at 1 *l.*) tythe and town charges,	5	4	0
		19	9	0

Produce.

2 *C. wt.* at 4*l.* -	8	0	0
Loſs, -	11	9	0

Which is *per* acre *per ann.*	£.2	17	3
On the ſix acres, –	68	14	0

Obſervations.

It has been already remarked, that drawing plants injures a crop ſo greatly, that whenever Mr. *Arbuthnot* often repeats the drawing from the ſame plantation, he gives up the expectation of a crop; knowing that it muſt be thereby ruined. The loſs upon this account therefore, is no objection to the madder culture; it is the price at which all the plants drawn from ſix acres are purchaſed. What principally demands attention on this experiment, is the great expence at which plants are procured when they are drawn from a crop in the ſpring. Therefore, though it would not be proper to leave the whole crop to be taken up in the ſpring for the ſake of obtaining plants, yet it is adviſeable to leave ſuch a proportion of it as will ſupply the required quantity of plants; on an average one may reckon, if the crop is good, that each ſtool will produce in the different drawings from 30 to 40 plants, but it is not adviſeable to truſt to too many drawings, as that may carry you too far in the ſpring, and endanger the new plantation from the drought.

Experiment, No. 14.

In 1767, fallowed 10 acres of a ſtrong loamy ſoil; ploughed it 4 times, 13 inches deep. In autumn manured ſeven acres of it with farm-yard dung, at the rate of 20 loads an acre; covered the dung by ridging the field into 3 ½ feet lands; manured the other three acres with trotters, 6 quarters *per* acre: and left the whole well water-furrowed for winter.

1768.

In *April*, planted one row on a land, by drawing a furrow with a *Suffolk* plough on the middle of the ridges, about 6 inches deep; ſpring plants were laid in the furrows by women and children, and earth drawn on them by men with broad hoes; and the furrows then ſtruck with the double mould-board plough. The rows were hand-weeded twice; and the intervals thrice ploughed with ſhim and double mould-board plough; and in autumn the furrows ſtruck with the ſame implement. The field was then water-furrowed.

1769.

This year the plantation was hand-hoed thrice, and the intervals ploughed four times with the ſhim and double mould-board. In autumn the furrows ſtruck deep.

1770.

Hand-hoed the beds twice; ſhimmed the furrows twice, and each time followed it by the double mould-board plough.

Account of the ſeven acres.

Expences.

1767.	Ploughing four times,	£.2	12	0
	Manuring,	6	0	0
	Ridging up,	0	7	6
	Water-furrowing, -	0	1	6
1768.	Planting, - -	0	18	0
	Hand-weeding twice,	0	12	0
	Shim thrice, - -	0	2	9
	Double mould-board ditto,	0	3	6
	Striking furrows, -	0	2	6
	Water-furrowing, -	0	1	0
1769.	Three hand-hoeings, -	1	10	0
	Carry over, -	12	10	0

Brought over,	£. 12	10	0
Shim four times, -	0	2	8
Double mould-board ditto,	0	4	8
Striking furrows, -	0	2	6
Water-furrowing, -	0	1	0
Two hand-hoeings,	1	0	0
Shim twice, -	0	1	4
Double mould-board plough ditto, -	0	2	4
Taking up, -	4	0	0
Drying, at 3 *s.* -	2	5	0
Four years rent, (16 *s.*) tythe, &c. -	4	8	0
	24	17	6

Produce.

15 *C. wt.* at 4 *l.* -	60	0	0
Expences, -	24	17	6
Clear profit, -	35	2	6
Which is *per* acre *per annum*, - -	8	15	7
And on the 7 acres,	61	9	1

Account of the three acres.

Expences.

Every article the ſame as the preceding, except manuring and drying, — —	£. 5	12	6
6 Quarters an acre trotters,	3	12	0
Drying, at 3*s*. — —	1	16	0
	11	0	6

Produce.

10 *C. wt.* at 4*l*. — —	40	0	0
Expences, — —	11	0	6
Clear profit, — —	28	19	6
Which is *per* acre *per ann.*	7	4	11
And on the 3 acres, —	21	14	9
Profit by dunging, —	8	15	7
——— trotters, —	7	4	11
	1	10	8
Weight *per* acre from dung, -	15	0	0
——— from trotters,	10	0	0
	5	0	0

Product of the ten acres,	£. 540	0	0
Expences ditto, -	206	14	0
Profit ditto, -	333	6	0
Which is *per* acre -	33	6	7
And *per* acre *per ann.*	8	6	7

Obſervations.

The great importance of applying the proper ſort of dung is here apparent. Farm-yard compoſt, it is plain, much exceeds trotters. Top dreſſings of all ſorts are too ſmall in quantity, however rich, to laſt with effect three years; they want, eſpecially on ſtiff land, the power of keeping it open, and aiding in pulverization. The profit of theſe crops are conſiderable, and prove how important this culture certainly is.

Experiment, No. 15.

Three acres of the ſame ſoil as No. 14. were treated exactly in the ſame manner as the ſeven acres of that trial. Crop the ſame.

Expences.

Sundries as before,	-	£.24	17	6

Produce.

15 *C. wt.* at 4*l.*	- -	60	0	0
Expences,	- -	24	17	6
Clear profit,	-	35	2	6.
Or *per* acre *per ann.*	-	8	15	7
And on the three,	- -	26	6	9

Experiment, No. 16.

Seven acres of land planted before with madder, and regiſtered in Experiment, No. 8. were again planted in 1769: It laid all winter in very high arched up ridges, after taking up the preceding crop. In *March* it was dunged with 25 great loads an acre of farm-yard dung, remarkably black, rich, and rotten. It was then ploughed into lands; ſome 3 feet wide, and ſome 4 feet; the latter were planted with two rows on each, 14 inches aſunder, and 10 inches from plant to plant: on the 3 feet lands, ſingle rows at 1 foot from ſet to ſet. The method followed in planting, was drawing furrows with a little plough; laying in the plants by women and children, and covering them with hand-hoes. They were hand-hoed thrice during the ſummer: horſe-hoed with the ſhim four times, and with the double mould-board plough as often. As ſoon as the haulm ſpread over the beds, the two rows were thrown into one by the double mould-board plough, the wings much extended, in the way that peaſe are earthed; and on the narrow lands the earth thrown up to them by the ſame plough. Thus the beds were left till autumn; when the furrows were ſtruck deep with the double mould-board, and the earth drawn by hoes in upon the haulm.

1770.

In the winter great quantities of chickweed appeared on the beds; owing, as believed, to the thickneſs of the dunging. This was all extracted by hand in the ſpring. After which it was hand-hoed once more; ſhimmed twice; and ploughed with double mould-board as often——in which manner it is left for autumn work.

It comes in courſe to be taken up in autumn 1771. It promiſes to be far ſuperior to any yet planted. Expences hitherto incurred are;

1769.	Manuring,	£.10	0	0
	Ploughing, with *Rotherham* ploughs, -	0	5	0
	Planting, - -	0	18	0
	Three hand-hoeings,	1	10	0
	Shim four times, -	0	2	8
	Double mould-board plough ditto, -	0	4	8
	Ditto ſtruck the furrows twice, - -	0	5	0
	Earthing, - -	0	5	0
1770.	Firſt weeding, -	1	10	0
	Second ditto, -	0	10	0
	Shim twice, -	0	1	4
	Double mould-board ditto,	0	2	4
		15	14	0

Experiment, No. 17.

Nine other acres of the ſame ſoil were alſo planted at the ſame time: this is the ſecond crop of madder: the firſt is regiſtred in Experiment, No. 9.—The rows, culture, expences, the ſame as No. 16.

Experiment, No. 18.

Two other acres were alſo planted at the ſame time as No. 16. they yielded peaſe in 1768 only podded; the land very clean; the tillage and planting the ſame: one half of it was manured like them, with 25 loads of rich yard dung; and the other half with 20 loads of ſheep dung taken from the ſheep pen.

It is on this crop very obſervable, that although the manuring, planting, &c. are the ſame with the above-mentioned 7 acres, yet is not the appearance of the crop near ſo good; this Mr. *Arbuthnot* can attribute only to the land not having received that extraordinary good and deep tillage, which the other had done by taking up the preceding crop: a ſtriking proof of the expediency of planting land with ſucceſſive crops of madder.

Experiment, No. 19.

Six acres of a rich, deep, black loam, were ſown with rye at *Michaelmas* 1768; but the crop failed. In *April* 1769, it was ploughed up; harrowed once; and planted by drawing furrows; double rows at 14 inches, with intervals of 2 feet 10 inches. The following ſummer hand-hoed the rows thrice: and horſe-hoed the intervals with ſhim and double mould-board thrice; covering by the laſt operation 15 ſacks an acre of rabbits dung: after which the furrows were ſtruck deep.

1770.

This year two hand-hoeings were given, and one weeding; and the intervals twice ploughed with ſhim and double mould-board.——

The appearance of this crop very great. The expences as follow.

1769.	Ploughing, -	£.0	7	6
	Harrowing, -	0	0	6
	Planting, - -	1	0	0
	Three hand-hoeings,	1	10	0
	Shim thrice, -	0	2	0
	Double mould-board ditto,	0	3	6
	15 Sacks rabbit dung, 1 *s.* 4 *d.* - -	1	0	0
	Striking furrows, -	0	2	6
1770.	Two hand-hoeings, -	1	0	0
	One weeding, -	0	7	0
	Shim twice, -	0	1	4
	Double mould-board ditto,	0	2	4
	l.	5	16	8

Experiment, No. 20.

The nine acres regiſtered in Experiment, No. 10. were again planted.

The land remained, after taking up, under a winter fallow. In ploughing up the crop a quickſand was cut into, from which the water aroſe: this induced Mr. *Arbuthnot* to drain it very deep with covered drains: he carried ten through the field, 4 feet deep; the length was 600 rods; and the expence 30*l*.

It was dunged in the ſpring with 25 loads an acre of rotten yard dung, which were ploughed in, and afterwards the land croſs ploughed: it was then ſlit down flat; rolled with the ſpiky roller; and with the large common one to break the ſmall clods left by the other. As the land was drained, it was planted flat; double rows at 14 inches, and 9 inches in the rows, with intervals of 2 feet 4 inches: executed by drawing furrows as before, laying the plants in them, and covering them with hoes. They were twice hand-hoed: ſhimmed twice; and the furrows twice ploughed with the double mould-board. The expences as follow.

1770.	Draining, -	£.3	6	8
	Manuring, -	7	10	0
	Ploughing three times with *Rotherham*, -	0	15	0
	Rolling with ſpiky roller,	0	2	0
	Ditto with large common ditto, - -	0	1	6
	Planting, - -	1	0	0
	Two hand-hoeings, -	1	0	0
	Shim twice, -	0	1	4
	Double mould-board ditto,	0	2	4
	Filling vacancies, -	0	15	0
		14	13	10

Experiment, No. 21.

Four acres planted with madder in 1767 (See Experiment, No. 11.) and deſtroyed by the ſod worm, were again planted. The turnips were fed on the ground by ſheep in the ſpring; but finding it much baked, Mr. *Arbuthnot* ordered it to be broken up with a plough with 2 coulters. It was then worked with ſpiky roller, and ſown with barley; the ſtubble of which, was manured with 25 large loads an acre of purchaſed dung; ſo rotten, that it appeared peated like black butter; it was ploughed in 12 inches deep, laying it at the ſame time in large round lands. In which manner it remained the winter.

1770.

In the ſpring, ploughed it in the gathering way, beginning in the middle, and ending in the old furrows, which deepened them for the purpoſe of draining: a point of conſequence as the ſoil is ſpringy. It turned up whole furrow; it was therefore worked with a ſpiky roller; and after a ſhower of rain harrowed, and rolled with common roller; after which it was harrowed again: upon which operation it was planted, by drawing furrows as before. It has been horſe-hoed twice with the ſhim, and as often with double mould-board.

Expences.

1769.	Manuring, -	£.10	10	0
	Ploughing, -	0	17	0
	Ditto a common earth *,	0	4	6
	Spiky roller, -	0	2	0
	Carry over, -	11	13	6

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* *N. B.* Three *Rotherham* ploughs did 4 acres in a day.

Brought over,	£.11	13	6
Common harrowing, -	0	0	6
Ditto rolling, -	0	0	3
Planting, - -	1	0	0
Shim twice, -	0	1	4
Double mould-board plough ditto, -	0	2	4
	12	17	11

Experiment, No. 22.

Two acres of land were cropped in 1769, one with potatoes, and the other with turnips; the latter was very much poached by drawing and carting them off. Both the turnips and potatoes were manured for, at the rate of 15 loads of good dung *per* acre. —The potatoe ridges were ſlit down, and ſown with 2 loads of rabbit dung.

The turnip land ploughed up whole furrow; it was left till dry, and then run over with ſpiky roller and manured; half the acre with 50 buſhels of lime, and the other half with 5 loads of ſifted coal aſhes. The whole two acres planted flat. It has been twice hand-hoed; and been horſe-hoed with ſhim and double mould-board plough once. The piece has carried an indifferent appearance; but the potatoe half the beſt.——The expences of the Potatoe acre.

1770.	Ploughing, -	£.0	5	0
	2 Loads rabbit dung,	7	0	0
	Ploughing, -	0	5	0
	Planting, - -	1	0	0
	Two hand-hoeings, -	1	0	0
	Shim once, -	0	0	8
	Double mould-board ditto,	0	1	2
		9	11	10

Of the Turnip acre.

Ploughing, -	0	7	6
Spiky roller, -	0	2	0
50 Buſhels lime, at 9*d.*	1	17	6
5 Loads coal aſhes, -	3	0	0
Ploughing, -	0	5	0
Planting, - -	1	0	0
Hand and horſe-hoeing,	1	1	10
	7	13	10

Experiment, No. 23.

One acre of good mellow loam was ploughed up in autumn 1769, being part of a madder crop. The lands 8 feet broad, and 2 feet higher in the center than in the furrows; in which manner it was left till ſpring.

1770.

In *May*, two ſmall furrows were turned from the beds, and the land then manured with 2 loads of rabbit dung harrowed in. It was then planted in double rows, at 14 inches, in the old furrows of the 8 feet beds: This was done with an intention to manure the large intervals, and plough them gradually to the rows; but the intervals were ſo high, and the weather wet, that the carts could not go on, which prevented the intended earthing of the rows; but they were twice hand-hoed; and the whole interval ſhimmed once. The appearance of the crop very dwindling, owing, as believed, to its being planted too late.

The expences.

1770.	Manuring, -	£.7	0	0
	Harrowing, -	0	0	6
	Planting, - -	0	10	0
	Hand-hoeing, -	0	15	0
	Shim once, - -	0	1	6
		8	7	0

Upon this experiment it ſhould be obſerved, that our very ingenious cultivator having diſcovered a peculiarity in the growth of madder, formed this trial to aſcertain the fact in large: He obſerved, from an experiment made on a plant in the garden, that by earthing up the rows, the ſtalk was converted to the richeſt part of the root: this uncommon circumſtance gave him the hint of planting in the furrows, inſtead of on the tops of the ridges, with intention of forming the ridge into a rich compoſt, and turn it gradually to the rows, until the furrows came to be ſituated in the center of the old ridges, and the rows growing out of new ones—in a word, to plant and cultivate madder in the common method of managing celery. The thought is a beautiful one; how far it will anſwer in practice, experience can alone determine: the only objection that appears at firſt view is, the doubt whether the rows will ſpread ſufficiently to fill ſuch large ſpaces: but this concerns only wide intervals; it may be found proper to adopt this new method in furrows of two or three feet lands, as well as thoſe of 8 feet ones. It muſt depend greatly on the fertility of the ſoil ploughed down to the rows; for as the whole depends on a vaſt luxuriant ſtrength of ſhoots, it muſt be abſolutely neceſſary to force them as much as poſſible. If madder was planted, literally ſpeaking, in a dunghill, this method appears to be the moſt eligible; and it will probably be found *comparatively* ſucceſsful, in exact proportion to the richneſs of the land.

Experiment, No. 24.

Four acres of light ſandy loam were cropped with barley in 1769; and the ſtubble being ploughed up directly after harveſt, cabbages were planted on it; which were fed on the land, in the ſpring, by ſheep; it was then ploughed into broad lands with deep furrows for draining it; this ploughing was not more than eight inches deep, the earth for the cabbages being at leaſt 12 deep. It was then ſpiky rolled and planted.

One acre was folded, and the reſt manured with rabbit dung, about 70 ſacks an acre, harrowed in. The planting was performed as before, by drawing furrows. They have been twice hand-hoed; and horſe-hoed once more with ſhim and double mould-board plough.

The appearance of the plants very good, except in the lower part of the field, which is wet.

Expences.

1770.	Ploughing, –	£. 0	7	6
	Spiky rolling, –	0	2	0
	Rabbits dung, –	4	4	0
	Planting, – –	1	0	0
	Hand-hoeing twice, –	1	0	0
	Shim, – –	0	0	8
	Double mould-board,	0	1	2
		6	15	4

Experiment, No. 25.

Seven acres of a dark rich mould on brick earth, were manured with 25 loads an acre of purchaſed dung, that had laid three years without turning; quite black butter. It was ploughed in 14 inches deep in broad lands with great wheel plough; the furrows left deep. Mr. *Arbuthnot* remarked that the worms worked the dung quite through all the furrows; from whence he juſtly concludes that there is no danger of burying dung; an idea common among the farmers.

On diſſecting many of the tubes made by the worms, he found them from top to bottom full of ſolid dung; from whence it is evident, that they mix the dung more immediately with the ſoil than could be performed by any tool.

1770.

In the ſpring of this year the lands were arched up by a gathering earth, and harrowed and rolled; alſo ox-harrowed. Planted in double rows, 14 inches aſunder, on 4 feet lands. They have been hand-weeded twice; and ploughed with ſhim and double mould-board plough twice.

The appearance of the crop is remarkably great.

The expences.

1769.	Manuring, -	£. 10	10	0
	Ploughing, -	0	14	0
1770.	Gathering, -	0	5	0
	Harrowing twice, -	0	1	0
	Rolling, - -	0	0	6
	Harrowing, -	0	1	0
	Carry over, -	11	11	6

Brought over,	£. 11	11	6
Planting, - -	1	0	0
Hand-hoeing, -	1	0	0
Shim, - -	0	1	4
Double mould-board plough, - -	0	2	4
	13	15	2

Experiment, No. 26.

Five acres of a deep, black, rich, loamy ſoil were cropped with turnips in 1769, the crop eaten on the land by ſheep; ploughed early in the ſpring: It was then manured with 8 loads an acre of night ſoil from *London*, which were ploughed in, and the land harrowed flat; upon this harrowing the ſets were planted as in the preceding trials. The crop has been once hand-hoed; once weeded; and horſe-hoed twice with double mould-board plough, which earths up the plants, and once with the ſhim. The appearance of the crop very great.

Expences.

1770.	Firſt ploughing, -	£. 0	5	0
	8 Loads, at 11 *s.* -	4	8	0
	Carry over, -	4	13	0

Brought over,	£.4	13	0
Second earth, -	0	5	0
Harrowing, -	0	1	0
Planting, - -	1	0	0
Hand-hoeing, -	0	10	0
Weeding, - -	0	6	0
Shim, - -	0	0	8
Double mould-board,	0	2	4
	6	18	0

Experiment, No. 27.

In 1766, Mr. *Arbuthnot* ſet one plant of madder in his garden. A hole was dug of 3 feet diameter, and filled with the rotten mould of a melon bed; as it grew it was regularly earthed up with the ſame mould, the vines of the plant being ſpread, and the earth laid on them, leaving out the points; continued this earthing during that year, and in autumn covered the whole with the melon mould. The two following years the ſame management was obſerved in every reſpect. In autumn 1768, dug it up; the plants and roots were waſhed clean and drained from water; the weight green, 42 *lb.*; dryed ready for grinding, it weighed 7 ¼ *lb.*; the dry weight, therefore, is rather better than a ſixth of that green.

He has alſo another plant, now growing, which was ſet the ſame day, and treated in the ſame manner on a black ſoil near the ſurface of water, to determine how far it will prejudice the root.

Obſervations.

A ſingle plant of madder coming in three years to 7 ¼ *lb.* is a moſt extraordinary growth. But it is obſervable that this plant did not diminiſh above 6–7ths, whereas the general run of plants diminiſh 7–8ths. This muſt be attributed to the ſolidity of the plant from its extraordinary ſize. This evidently ſhews that ground cannot be made too rich. And though the treatment was not ſuch as could be imitated in a field, yet it ſhould be conſidered as a leſſon to madder planters; never to fear exceſſive richneſs of ſoil or manure: it is evident that no manuring is too much for this vegetable; and in all probability this fact will be found ſo extenſively true, that it may anſwer to contract the attention and expence of ten acres to a ſingle one. Suppoſe an acre planted in the ſame manner as in the above experiment, there would be 4840 plants, which at 7 ¼ *lb.* amount to 15 tons 13 *C. wt.* and at 4*l.* 10*s. per C. wt.* to 1408*l.* If you cover an acre a yard deep with dung or rotten compoſt, it will take 4840 loads, of 30 buſhels each, which may be called 3500 farmers loads, and at 8*s.* come to 1400*l.* It is clear the experiment on an acre of land would be a loſing one; but it is at the ſame time aſtoniſhing to think how near the firſt crop would come towards paying ſuch an immenſe expence. But ſuppoſe the land, in the taking up ſuch a crop, to be dug 4 feet deep from the ſurface, 1 foot of the old mould would then be mixed with the new addition of 3 feet, and on this a new plantation of madder for three years more; the probability of a vaſt profit would then be great—and the land would for ever bear the richeſt crops.

GENERAL OBSERVATIONS.

The culture of this valuable plant has been ſo great a novelty in *England*, that not one farmer in five hundred knows that ſuch a vegetable exiſts; even the endeavours, ſpirited as they have been, of a very patriotic ſociety, have not done much in extending the culture through this kingdom: a premium of 5 *l. per* acre on all planted, was a meaſure that ſeemed to inſure ſucceſs, and to promiſe us the laſting benefit of raiſing as much of this dye as our manufactures require. But this appearance has been ſomewhat deceitful: very many claimants for the premium have diſcontinued the culture from its proving diſadvantageous; and the general idea has been, that we cannot rival the *Dutch* in this branch of agriculture. The failures that have happened, probably have ariſen from a want of knowledge in the nature of the plant, and the proper method of treating it—and doubtleſs much miſchief was done by an elaborate publication under a celebrated name, which interdicted the uſe of dung. But to whatever cauſe it has been owing, certain it is that this branch of cultivation has made no progreſs: the Society's premiums raiſed a temporary purſuit, which has of late ſubſided, and left this important article in a fair way to as total a neglect as ever it was in through the firſt half of the preſent century.

In this ſituation there was little hope of reviving the attention of the public to madder, unleſs ſome very ſpirited experiments were made, which ſhould prove how far the culture is beneficial—what ſoil is proper for it—and what treatment requiſite in planting, cleaning, &c. Reports concerning it were ſo vague, that no dependance could be placed in them; nothing could be liſtened to but real proof—and not only *real*, but *diſintereſted* proof; for perſons intereſted in the *trade* of madder, had promiſed ſuch mountains of profit, that every aſſertion began to be ſuſpected; until many people treated the idea of it as a profitable article of *Engliſh* culture, as a chimera.

In this critical juncture Mr. *Arbuthnot* gave his attention to cultivating madder, and from the moment he began, has proſecuted it with a ſpirit that does honour, not to himſelf alone, but I will venture to add, even TO HIS COUNTRY. The unremitted attention which he has given to every minutiæ of the culture, and the ſteady perſeverance with which he has attacked every difficulty as it aroſe; have been nobly calculated for commanding ſucceſs.

He has ſhewn the world that madder may be profitably cultivated on ſoils not of extraordinary natural fertility—that thorough good huſbandry, with rich manuring, will prove ſufficient; conſequently, that our madder culture need not be confined to ſpots unuſually rich, but extended over moſt parts of the kingdom, except on very poor, ſtoney, or clayey ſoils.

The patriotic ideas of a private individual ſo ſpiritedly exerted, deſerves the utmoſt commendation; but the teſtimony of many hundred perſons to whom this gentleman has ſhewn and explained (with the utmoſt freedom and candour) all his experiments, renders any eulogy unneceſſary.

It ſhould be obſerved, that the preceding experiments which are complete, include only the beginning of his culture; many variations are made, not from experience having proved them right, (for there has not been time for the completion of ſuch) but to diſcover from the event the moſt advantageous. They include ſeveral trials which ſuffered from a want of that knowledge which he now poſſeſſes; and I would further add, that none of them nearly equalled, in appearance, moſt of his crops at preſent on the ground.

By throwing the particulars into one view, a clearer idea will be formed of them.

Experiment, No. 7. The firſt crop, loſs on one acre,	£.31	9	0.
No. 13. Ditto on 6 acres,	68	14	0
	100	3	0

This ſum being the amount of loſs in the preceding trials, is the price of the plants when not purchaſed; when they were bought, the amount is charged in the reſpective account. 98 Acres have been planted; it may therefore be called 20s. an acre, as there is no probability of the crops on the ground turning out unprofitable. The ſum of 20s. an acre is therefore to be deducted from each crop.

Experiment, No. 8. Profit on 7 acres,	£.165	0				
Deduct for plants,	7	0	0			
				158	0	6
No. 9. Profit on 9 acres, –	245	1	0			
Deduct, –	9	0	0			
				236	1	0
Profit on 17 acres in 3 years,				394	1	6

No. 10. Half an acre, -	£. 15	2	1			
Six acres, -	72	17	0			
Two and half ditto,	54	16	3			
	142	15	4			
Deduct,	9	0	0	133	15	4
No. 12. Profit on 4 acres, -	97	19	4			
Deduct, -	4	0	0	93	19	4
No. 14. Profit on 7 acres, -	245	17	6			
Deduct, -	7	0	0	238	17	6
No. 14. Profit on 3 acres,	86	18	6			
Deduct, -	3	0	0	83	18	6
No. 15. Profit on 3 acres, -	105	7	6			
Deduct	3	0	0	102	7	6
Profit on 26 acres in 4 years,				652	18	2
Which is *per* acre, - -				25	2	2
And *per annum*, -				6	5	6

394 *l.* 1 *s.* 6 *d.* on 17 acres, in 3 years, are *per* acre, -	£.23	3	0
And *per annum*, - -	7	14	4
Ditto on the 4 years, -	6	5	6
Superiority, -	1	8	10

I need not here be particular in obſerving, that the profit made by an application of the land during three years, being ſuperior to that of four, is a circumſtance deciſive in favour of the ſhorter time, as the land, it is to be ſuppoſed, might have been applied in the extra year to other advantage: the profit of three years equalling four, ſhews that the ground, in the latter, was in a ſtate that required the previous fallow, and which it muſt have had for any other crop.

It ſhould here be obſerved, that Mr. *Arbuthnot* is clearly of opinion, that no crop requires *cleaner* ground, from the great difficulty of extracting root-weeds from among the fibres of the plants, which conſequently would, in three years, get entire poſſeſſion of the ground.

The average profit *per* acre *per ann.* on all the crops taken up, amounting to above 7*l.* 7*s.* is, upon the whole, a degree of advantage, that ſpeaks greatly in favour of the culture. It is in itſelf very conſiderable, and much exceeds any thing that common huſbandry can execute; but there are attendant circumſtances, which ſhould, on no account, be overlooked: this average is drawn from the firſt crops raiſed. Mr. *Arbuthnot* had no guides to follow, but ſuch as led him much aſtray: he found no directions in books, but ſuch as loſt him conſiderable ſums of money. Under theſe diſadvantages, with that univerſally acting one, the want of experience, it is aſtoniſhing, that the crops here minuted ſhould turn out profitable on the whole, and is, I think, a much greater proof of the advantages of the culture, than much ſuperior ſucceſs hereafter may turn out. If the difficulties attending new undertakings be conſidered, this will not be thought an extravagant idea. Notwithſtanding theſe unfavourable circumſtances, yet, had the ſoil been naturally rich, ſuch as old hop-grounds for inſtance, the profit would certainly have been conſiderably greater, probably double.

A clear profit of 7*l.* 7*s.* *per* acre *per annum*, on a plant, whoſe culture ameliorates and cleans the ſoil in a great degree, deſerves no ſlight attention. It will be difficult to find a well-managed farm that pays 40*s.* an acre clear profit; but theſe beginnings in the madder culture return more than thrice as much. It muſt be the very perfection of common huſbandry to pay two or three pounds *per* acre, but madder does it even under very unfavourable circumſtances, unavoidable at firſt ſetting out: the one cleans the land, the other fills it with weeds. All theſe crops receive 30*s.* *per* acre *per ann.* in hand-hoeing alone, beſides numerous horſe-hoeings. And the extraordinary tillage the ground receives, by taking up the roots, is ſuch as no other huſbandry will admit of, except the ſimilar culture of licquorice. It is known about *Pomfret*, that, by this tillage, they are able to repeat the ſame crop *ad infinitum*: a practice, which, Mr. *Arbuthnot* is very clear, may be purſued in madder; which, indeed, is confirmed by experiment, No. 8 and 16. Nor is it to be believed, that this plant, notwithſtanding the great luxuriance of the growth, can impoveriſh the land, as it is well known, that all green ſmothering crops, to which this is ſimilar, are great improvers, provided they are not ſuffered to perfect their ſeed, which madder rarely does in this country. The crops now on the ground look, beyond all comparifon, better than thoſe which have been taken up; from which it is extremely evident, that the products will be vaſtly larger, although the expences are encreaſed but little. Upon the whole, the advantages of madder are ſo great, that no perſon need to fear a vaſt profit, if he poſſeſſes the proper ſoil, and will follow the improved practice of this gentleman.

Theſe experiments are not only very conſiderable in their extent, but the concluſions to be drawn from them are uncommonly important; for we not only find what practice is beſt, but we alſo diſcover *why* it is beſt, from the experience of contrary meaſures.

The importance of very rich manuring, and the great miſchief done to the crops by drawing plants from them, are points that have hitherto been totally unknown, but are here proved in the cleareſt manner.

It ſhould be obſerved, that Mr. *Arbuthnot* has conſtantly found the roots of madder to bear exact proportion to the luxuriance of the branches and leaves: a circumſtance, which is not allowed to be the caſe by ſome, who have written on the ſubject.

From a converſation he has had with Mr. *Crowe* of *Feverſham*, he is determined once more to try winter plants, as the uncertainty of the ſeaſon, when ſpring plants can only be put into the ground, renders that practice very hazardous.

IV. EXPERIMENTS IN THE DRILL CULTURE OF SEVERAL CROPS.

There is not a part of agriculture, which has been more the ſubject of diverſity of opinion, than the comparative merit of the old and new huſbandry. Every experimenter has tried the practice of drilling; almoſt every one has given a different idea of it; yet, in ſuch variety, we have not hitherto met with any regular ſeries of trials, that have indiſputably decided the degree of advantage to be attributed to it. The very ingenious and accurate cultivator, whoſe experiments I have now the ſatiſfaction of laying before the public, has not overlooked this part of huſbandry; but has formed a variety of trials, upon a very different plan from any yet known.

Wheat, cultivated in this manner, is the object in general moſt attended to: it will be neceſſary here to unite it with beans, as ſome of the chief of Mr. *Arbuthnot*'s experiments in drilling wheat, are in ſucceſſion with drilled beans.

Experiment, No. 28.

Culture, expences, and produce, of eight acres of drilled beans.

1767.

Culture.

The ſoil of this field is a ſtrong, dark-coloured loam, tending to clay, on a clay bottom. In 1766, it yielded wheat, the ſtubble of which was very foul with numerous weeds. It was ploughed once in the ſpring, and on that earth dibled with beans, part tick, and part horſe-beans: of the firſt 2 ½ buſhels *per* acre; of the latter 2 buſhels: the rows equally diſtant, 16 inches aſunder: they were hand-hoed twice; the crops 3 ½ quarters *per* acre.

Expences per acre.

One ploughing, - -	£. 0	10	0
Seed, - -	0	8	0
Dibling, - -	0	6	0
Two hand-hoeings, -	0	12	0
Reaping, - -	0	7	0
Harveſting, - -	0	5	0
Thraſhing, 3 ½ quarters, -	0	4	6
Carrying ditto out, -	0	5	0
Rent, &c. &c. -	1	2	0
Total, -	3	19	6

Produce.

Three quarters and a half,* at 26*s.*	4	11	0
Straw, - -	1	10	0
	6	1	0
Expences, - -	3	19	6
Clear Profit,	2	1	6
And on the 8 acres, -	16	12	0

Near two guineas an acre profit on a crop, that is to be conſidered as a preparative for corn, and a ſubſtitute for a fallow, is very conſiderable. It is a ſtrong proof, that drilled beans, even on a ſingle ploughing, may be depended on for cleaning a foul piece of land, and, at the ſame time, yielding a very beneficial produce.

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* N. B. The meaſure is nine gallons for this and all the enſuing experiments.

Experiment, No. 29.

Culture, expences, and produce, of eight acres of drilled wheat.

1768.

Culture.

The bean ſtubble of the preceding experiment was ploughed directly after harveſt, throwing down the lands. The field was then croſs ploughed with little *Suffolk* ſwing ploughs. Five of them did the 8 acres in a day; after which it was ridged up again: the ridges two bout lands, 3 ½ feet over. They were harrowed once and drilled; two rows of wheat on each, at ten inches aſunder: the quantity of ſeed three pecks *per* acre. After the drilling, the furrows were ſtruck with the double mould-board plough, and the land left well water-furrowed. In the ſpring, ten ſacks an acre of malt-duſt were ſown on the corn; the ten-inch partition was once horſe-hoed with the ſhim, and the intervals five times with the ſame inſtrument, being followed each time by the double mould-board plough. The laſt horſe-hoeing was after the bloſſoming of the corn, the horſes being muzzled: the rows were once hand-hoed with five-inch hoes. The product 4 quarters *per* acre.

Expences.

1768.	Firſt ploughing, -	£.0	8	6
	Second ditto, -	0	4	6
	Third ditto, - -	0	4	6
	Harrowing, - -	0	0	6
	Three pecks of ſeed,	0	5	0
	Drilling, - -	0	1	6
	Striking furrows, -	0	1	2
	Water-furrowing, -	0	1	0
	Two ſacks of malt-duſt, at 1 *s.* 4 *d.* -	1	6	8
	Shim ſix times, -	0	4	0
	Double mould-board, 5 dit.	0	5	10
	Once hand-hoeing,	0	4	0
	Reaping, - -	0	8	0
	This is a great price; but the men would not do it for leſs, on account of its being ſprawled about.			
	Harveſting, - -	0	3	0
	Thraſhing and binding the ſtraw, -	0	13	6
	Carrying out, -	0	2	0
	Rent, &c. &c. -	1	2	0
	Total, - -	5	15	8

Produce.

4 Quarters, at 52*s.* 6*d.* £.	10	10	0
1 ½ Load ſtraw, -	1	10	0
	12	0	0
Expences, -	5	15	8
Clear profit, - -	6	4	4
And on the 8 acres,	49	14	8

Obſervations.

This crop reflects no ſlight honour on the drill culture of wheat; and much exceeds what is conceived of it in nine tenths of the kingdom. The profit of more than 6*l. per* acre is not the only object; the hoeings, amounting to thirteen operations, could not fail being of great ſervice to the land, both in ameliorating and cleaning it. The efficacy of ſuch means of cleaning can never be doubted: for here was a wheat ſtubble taken out of the hands of a wretched farmer, as foul as poſſible; by one hoeing crop of beans it is prepared for wheat; that wheat kept as clean as a garden, and yet pays 6*l.* an acre profit: In product, many broadcaſt crops exceed it, but then the land is left in a very different ſtate.

It will not be improper to remark, that this mode of drilling leaves an interval of 2 feet 8 inches wide, which is much narrower than the ſpace recommended by *Tull*, and ſo regularly perſiſted in by M. *de Chateauvieux*. It is evident that ſuch a ſpace is ſufficient for every purpoſe of keeping the land clean. The horſe-hoeing in the 10 inch partition was with a ſmall ſhare in the ſhim on purpoſe for ſuch a breadth.

Experiment, No. 30.

Culture, expences, and produce of eight acres of drilled beans.

1769.

Culture.

The wheat ſtubble of the laſt experiment was ploughed up the beginning of *December*; the ridges on which the wheat grew being reverſed: they were then drilled with beans, double rows on each, at 14 inches; conſequently the intervals were 2 feet 4 inches. The ſeed, 2 buſhels an acre. Five acres were the mazagan ſort, and three the tick. The culture beſtowed on them while growing, conſiſted of two hand-hoeings, and ſix horſe-hoeings; three with the ſhim, and as many with the double mould-board plough. The product was 3 quarters *per* acre.

Account of the mazagan.

Expences.

1769.	Ploughing, -	£.0	4	6
	Harrowing, -	0	0	6
	Drilling, - -	0	1	6
	Seed, - -	0	10	0
	Striking furrows, -	0	1	2
	Water-furrowing, -	0	1	0
	Two hand-hoeings, -	0	10	0
	Shim thrice, -	0	2	0
	Double mould-board ditto,	0	3	6
	Reaping, - -	0	8	0
	Harveſting, - -	0	3	0
	Thraſhing 3 quarters, 1 *s.* 2 *d.* - -	0	3	6
	Rent, &c. - -	1	2	0
		3	10	8

Produce.

3 Quarters beans, at 40 *s.*	6	0	0
Straw, -	0	10	0
	6	10	0
Expences,	3	10	8
Profit,	2	19	4
On the 5 acres,	14	16	8

Account of the ticks.

Expences.

As above, except ſeed,	3	0	8
Seed, 2 buſhels, at 3*s.* 6*d.*	0	7	0
	3	7	8

Produce.

3 Quarters, at 28*s.* -	4	4	0
Straw, - -	1	0	0
	5	4	0
Expences, -	3	7	8
Profit, - - -	1	16	4
On the three acres, -	5	9	0
Ditto the five, -	14	16	8
Total, -	20	5	8
Average, - -	2	10	8

Obſervations.

The difference in the profit between the two ſorts is great, and ſhews how much, in many caſes, depends on chuſing the ſort of ſeed with judgment. Mr. *Arbuthnot* has remarked, that the great advantage of the mazagan bean, is its being harveſted a month before the tick, and ſix weeks before

fore the common horſe-bean; which in many inſtances is a moſt valuable circumſtance: and if a perſon chuſes to ſow turnips among his beans, to be covered by the laſt hoeing, this ſort, by coming off ſo early, muſt ſuit much the beſt. The meal is far whiter, and the bean fuller of it than any other ſort.

Experiment, No. 31.

Culture, expences, and produce of eight acres of drilled wheat.

1770.

Culture.

The ſame field. The bean ridges ploughed down directly after harveſt, and then croſs ploughed; upon which earth it was ox-harrowed; that is, with the great harrows drawn by horſes. Next it was ridged up again into 3 ½ feet lands, and harrowed with one horſe.* In *October* it was drilled with wheat; 4 rows on each land, 8 inches aſunder, with 1 buſhel *per acre*. After which the furrows were ſtruck as uſual with a double mould-board plough, and the field water-furrowed.

The 14th of *November*, one land was manured with rabbit dung, at the rate of

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* This is done with one horſe walking in the furrow, drawing two ſmall harrows, each covering a land.

18 ſacks *per* acre, at 1 *s.* 2 *d.* a ſack. Another land with poultry dung, at the rate of 72 buſhels *per* acre, at 6 *d.* And a third with wood aſhes, the ſame quantity, at 4 *d.* The poultry dung turned out much the beſt; the rabbit next; and the aſhes laſt. In *March* all the reſt of the field was manured with 20 ſacks an acre of rabbit dung. It was hand-weeded once between the rows; and ſhimmed twice in the intervals of 1 foot 6 inches, and once with the double mould-board. The product 3 quarters *per* acre.

Expences.

Firſt ploughing, - -	£. 0	12	0
N. B. The land very dry.			
Second ditto, - -	0	10	0
Harrowing twice, 6 horſes,	0	3	0
Ridging up, - - -	0	4	6
Harrowing, - - -	0	0	3
Drilling, - - -	0	1	6
Seed, - - - -	0	6	0
Striking furrows, - -	0	1	2
Water-furrowing, - -	0	1	0
20 Sacks rabbit dung, at 1 *s.* 2 *d.*	1	3	4
Hand-hoeing, - -	0	4	0
Shim, - -	0	1	4
Double mould-board, -	0	1	2
Reaping, - -	0	8	6
Carry over, - -	3	17	9

Brought over,	£.3	17	9
Harveſting,	0	5	0
Thraſhing,	0	9	0
Carrying out,	0	1	6
Rent, &c.	1	2	0
	5	15	3

Produce.

3 Quarters, at 50*s.*	7	10	0
1 ½ Load ſtraw, at 25*s.*	1	17	6
	9	7	6
Expences,	5	15	3
Profit,	3	12	3
On the 8 acres,	28	18	0

Obſervations.

Here ends a courſe of 4 years drilling on the ſame land; it includes, therefore, all the circumſtances that could affect common methods—whether favourable or unfavourable. The land was received in foul order—no other fallow was given to clean it than drilled crops; that material end was anſwered, and the products at the ſame time profitable. But the merit of the culture will beſt appear from throwing the whole into one view.

	Expences,	Product,	Profit,
1767. Beans.	£.3 19 6	£.6 1 0	£.2 1 6
1768. Wheat.	5 15 8	12 0 0	6 4 4
1769. Beans.	3 9 6	6 0 3	2 10 8
1770. Wheat.	5 15 3	9 7 6	3 12 3
Totals *per* acre, —	18 19 11	33 8 9	14 8 9
Ditto of the 8 acres, —	151 19 4	267 10 0	115 10 0
Average *per* acre *per ann.*	4 14 11	8 7 2	3 12 2
Per 100 acres *per ann.*	474 11 8	835 16 8	360 16 8

This table ſhews the exact degree of the advantage of the drill culture. The point to be moſt attended to, is the profit of 3 *l.* 12 *s.* 2 *d.* *per* acre *per ann.*; upon which it may be obſerved, that there is not the leaſt reaſon to ſuppoſe the common method would have equalled it. One ſummer fallow at a dead expence would have been included; and in all probability without producing better ſucceſſive crops. The farmers courſe here is, 1. Fallow; 2. Wheat; 3. Oats; 4. Clover; 5. Wheat; 6. Oats. Now it muſt be at once apparent to the moſt common apprehenſion, that this courſe cannot poſſibly equal the profit of 3 *l.* 12 *s.* 2 *d.* *per* acre.

But without recurring to an ideal comparison, is it not a noble anecdote in the hiſtory of drilling, that an annual *clear* profit of 360 *l.* 16 *s.* 8 *d.* may be made from 100 acres of ploughed land? — by no means of ſuperior goodneſs. If ſuch a fact, deduced from the experience of four years, and not on a ſmall patch of land, but over a large field, does not abſolutely prove the benefit of this mode of drilling, nothing can, nor is there a fact in all huſbandry.

Reſpecting the probability of a farmer's ſucceſs in it; it is to be obſerved, that what a gentleman profitably executes *in large*, may undoubtedly be advantageouſly practiſed by a farmer; but if he curtails the expences, (which are high) or deviates from the directed path, it certainly is no fault of the huſbandry, but of the huſbandman. The drill plough with which theſe crops were drilled, admits of many variations, and yet is ſcarcely ever out of order; as any one may judge from the circumſtance of its having drilled ſome hundreds of acres without the leaſt repair.

This ſucceſſion of drilled beans and wheat, ſhews plainly that thoſe vegetables may follow one another for any number of years without any fallow—and this on land, as I before obſerved, not of the beſt quality.

Experiment, No. 32.

Culture, expences, and produce of ſeven acres of drilled beans.

1768.

Culture.

The ſoil of this field is the ſame as that of the four preceding trials. In 1766, it yielded oats; the ſtubble of which, very foul with twitch, was ploughed up early in the ſpring of 1767. It was ſown with hemp, with a deſign to clean it, by the advice of Dr. *Solander*; but it did not ſucceed; either from the poverty of the ſoil, from dry weather, or ſome other circumſtances. It came to nothing; was therefore ploughed up in *June*, and afterwards croſs ploughed. Next it was dragged with the great oxdrag, drawn by 6 horſes, going thrice in a place. After this it was ploughed flat, and cut up whole furrow, though the ſurface of the ground was like duſt: this was owing to the exceſſive weight of the draught. It then remained in this condition till dry enough to be made fine by harrowing and rolling; ridged up, into 3½ feet lands, the beginning of *September*. After this, ſo much rain came that it was impoſſible to drill wheat as intended; it was therefore water-furrowed and left till the winter.

It is here to be obſerved, that this diſappointment was very much owing to the dragging: the draft and the preſſure of the tines abſolutely ruined the ſeaſon; which is no uncommon effect with this prepoſterous machine, ſo much exceeded in utility on ſtrong land by the ſpiky roller. The ploughing up whole furrow after this operation ſufficiently proves it.

In *February*, 1768, the ridges were harrowed and drilled with horſe-beans, double rows, at 14 inches on each, 1 buſhel ſeed *per* acre. After which the water-furrows were ploughed and dug. In *April* the rows hand-hoed; and the beginning of *May* the 14 inch partition was horſe-hoed with a 9 inch ſhim, and the intervals with a 17 inch one: one horſe did 5 acres a day. The furrows were then ſtruck with a double mould-board plough. The beginning of *June* hand-hoed again; after which it was again horſe-hoed by ſhim and double mould-board. When ripe they were pulled by women. The product 3 ½ quarters *per* acre.

Expences.

1767.	Firſt ploughing, -	£.0	10	0
	Second ditto, -	0	7	6
	Third ditto, -	0	7	6
	Dragging, - -	0	4	6
	Fourth ploughing, -	0	7	6
	Harrowing, -	0	1	0
	Fifth ploughing, -	0	4	6
	Water-furrowing, -	0	1	6
1768.	Harrowing, - -	0	0	6
	Drilling, - -	0	1	6
	Seed, - - -	0	3	6
	Water-furrows,	0	1	6
	Two hand-hoeings, -	0	7	0
	Shim twice, -	0	1	4
	Double mould-board ditto,	0	2	4
	Pulling, - -	0	6	0
	Binding, - -	0	1	0
	Harveſting, - -	0	4	0
	Thraſhing, 3 ½ quarters, at 1 *s.* 4 *d.*	0	4	8
	Two years rent, &c.	2	4	0
		6	1	[illegible]

Expences, - -				£.6	1	4
Product.						
3½ Quarters, at 28*s.*	£.4	18	0			
1 Load ſtraw, -	1	0	0			
				5	18	0
Loſs, - - -				0	3	4

Obſervations.

Mr. *Arbuthnot*'s plan of culture for theſe fields, was to clean and bring them into heart by drilling: the loſs of the firſt year, with accumulated expences, was wholly owing to his adopting a hint of an ingenious foreigner: the ſcheme of hemp on land run out of heart and full of weeds was a bad one: hemp ſo far deſtroys weeds as to require no hand-hoeing or weeding; but then it muſt be ſown on land in heart, ſufficient to puſh it on to a vigorous luxuriant growth. Inſtead of hempen fallow, beans were to have been drilled, which would, as in the preceding field, have cleaned the land, and paid above 40*s.* an acre profit; and then wheat with much greater advantage. This loſs is therefore no effect of drilling.

There is another obſervation to be made here that may have its uſe; which is the crop not being the better for ſucceeding a ſummer fallow. Poſſibly it may be a buſhel or two ſuperior, but nothing comparable to the expence: this ſhould be a leſſon to all farmers to make their drilled beans the fallow; and never beſtow a preparatory one.

Experiment, No. 33.

Culture, expences, and produce of ſeven acres of drilled wheat.

1769.

Culture.

The bean ſtubble of Experiment, No. 32. was ploughed up directly after harveſt; the ridges being reverſed, and harrowed once. It was then begun to be drilled; 8 lands were done with double rows, at 14 inc. 3 pecks ſeed; but ſuch a deluge of rain then came, that the reſt of the field was afterwards forced to be ſown broad-caſt, and the ſeed covered by arching up the lands with a double plough, an invention of Mr. *Arbuthnot*'s, going once in a place; a man, a boy, and two horſes, did 5 acres a day: the quantity of ſeed uſed, 1 ½ buſhel *per* acre. 15 Sacks an acre of rabbit dung were ſown over the whole field, except the 8 ridges. The double mould-board plough followed the double plough in the furrows and ſtruck them.

In *March* the 8 ridges were manured, at the rate of 15 ſacks an acre of rabbit dung. In *April* they were hand-hoed, and the intervals horſe-hoed with ſhim and double mould-board plough. In *May* all theſe operations were repeated; and the two laſt once more in *June*. The broad-caſt was hand-weeded once. Product *per* acre, of the broad-caſt, 18 buſhels; of the drilled, 17 ½ buſhels. A load and half of ſtraw to the firſt, and a load to the ſecond.

Account of the broad-caſt per acre.

Expences.

Firſt ploughing, - -	£. 0	7	6
Harrowing, - - -	0	1	0
Seed, - - - -	0	9	0
Sowing, - - -	0	0	3
Second ploughing with double plough, - -	0	1	3
15 Sacks rabbit dung, -	0	19	0
Striking furrows with 3 horſes,	0	2	0
Water-furrowing, -	0	1	6
Carry over, -	2	1	6

Brought over,	£. 2	1	6
Hand-weeding,	0	6	0
Reaping,	0	9	0
Harveſting,	0	4	0
Thraſhing 18 buſh. at 4*d.* ½,	0	6	9
Carrying out,	0	1	6
Rent, &c. &c.	1	2	0
	4	10	9

Produce.

2 Quarters 2 buſhels, at 40*s.*	4	10	0
1 ½ Load ſtraw, at 25*s.*	1	17	6
	6	7	6
Expences,	4	10	9
Profit,	1	16	9

Account of the drilled per acre.

Expences.

Ploughing,	0	7	6
Harrowing,	0	1	0
Drilling,	0	1	6
Seed,	0	4	6
Striking furrows,	0	2	0
Water-furrowing,	0	1	6
15 Sacks rabbit dung,	0	19	0
Two hand-hoeings,	0	7	0
Carry over,	2	4	0

	£.	s.	d.
Brought over, -	2	4	0
Shim thrice, - - -	0	2	0
Double mould-board plough ditto,	0	3	6
Reaping, - - -	0	7	6
Harveſting, - - -	0	3	9
Thraſhing, 17 ½, at 4 *d.* ½, -	0	6	7
Carrying out, - -	0	1	6
Rent, &c. - - -	1	2	0
	4	10	10
Produce.			
2 Quarters 1 buſhel 2 pecks, at 40 *s.* - - -	4	7	6
1 Load ſtraw, - -	1	5	0
	5	12	6
Expences, - -	4	10	10
Profit, -	1	1	8
Profit by the broad-caſt,	1	16	9
Ditto by the drilled, -	1	1	8
Superiority of the former,	0	15	1

Obſervations.

The balance of this account is not a clear ſuperiority to that amount, becauſe the land in one caſe muſt certainly be left in better order than in the other—probably to the amount of this balance. As to products, the drill has the advantage, for the ſaving in ſeed exceeds the ſuperiority of product by one peck: this may however be called an equality.

Experiment, No. 34.

Culture, expences, and produce of ſeven acres of drilled beans.

1770.

Culture.

In *October* the wheat ſtubble was thrown down and water-furrowed. In *November* 5 acres were drilled with mazagan beans, 3 buſhels *per* acre, in double rows, at 14 inches; and again water-furrowed. In *February* the remaining two acres were dibbled in the ſame manner with the ſame bean. They were hand-hoed once in *April*; and horſe-hoed with ſhim and double mould-board. The crop found on a trial of thraſhing to be 3 ½ quarters *per* acre on an average of the whole: but the *February* ſeaſon not equal to *November* by 4 buſhels.

Expences.

Ploughing, - -	£.0	7	6
Water-furrowing,	0	1	0
Carry over, -	0	8	6

	£.	s.	d.
Brought over, -	£. 0	8	6
Drilling, - -	0	1	6
Seed, - - -	0	12	0
Water-furrowing, -	0	1	0
Hand-hoeing, - -	0	5	0
Shim, - - - -	0	0	8
Double mould-board -	0	1	2
Pulling and binding, -	0	10	6
Harveſting, - -	0	4	0
Thraſhing, at 1 *s.* 4 *d.* -	0	4	8
Rent, - -	1	2	0
	3	10	6

Produce.

	£.	s.	d.
3 ½ Quarters, at 40 *s.* -	7	0	0
1 Load of ſtraw, -	1	0	0
	8	0	0
Expences, - -	3	10	6
Profit, - -	4	9	6
On the 7 acres, -	31	6	6

Obſervations.

The regiſter of this ſeven acred field during four years, has not, on the whole, turned out near ſo advantageous as the preceding field of 8 acres. This will appear from throwing the whole into one view, as I before practiſed with the field above-mentioned.

1767 and 8. Beans.	Expences, £.6 1 4	Product, £.5 18 0	Loſs, £.0 3 4
1769. Wheat.	4 10 10	5 12 6	Profit, 1 1 8
1770. Beans.	3 10 6	8 0 0	4 9 6
Totals,	14 2 8	19 10 6	5 11 2
			0 3 4
			5 7 10
Ditto of the 7 acres,	98 18 8	136 13 6	30 14 10
Average *per* acre *per ann.*	3 10 8	4 17 7	1 1 11

The deficiency of a greater profit here, is not to be ſo much wondered at as the exiſtence of any. The heavy expence of a fallow inſtead of a profitable crop, which reduced the wheat years to one, changed the account from the very beginning:—under ſuch diſadvantages the clear annual profit of a guinea is by no means inconſiderable;

indeed, it is more than one farmer in an hundred makes. If two profitable crops be ſubſtituted in the room of the unprofitable one of the two firſt years, which would have been the caſe, had not the hemp been ſown, the account would, on the whole, have been very advantageous.

General obſervations on experiments 28, 29, 30, 31, 32, 33, and 34.

Mr. *Arbuthnot* threw theſe two fields into the alternate huſbandry of beans and wheat, to diſcover if the land could profitably be kept clean without a fallow: the affirmative is proved very ſtrongly in theſe trials; for the fields are both much cleaner than any farmer's ſtubbles in the country, and the bean one again ready for wheat, if it was thought proper to ſow that grain; but having conducted the trial through a courſe of four years, the concluſions are as clear, as if it was extended to fourteen: for the diſadvantages, which have occurred in the laſt regiſtered field, are greater, in all probability, than would happen in any ſucceeding four. That land may be kept clean, therefore, by the courſe of beans and wheat alternately, both being drilled, and the profit ariſing conſiderable, cannot for a moment be doubted.

But, at the ſame time that this gentleman is well convinced of the fact, yet he is of opinion, that it would be more profitable to crop ſuch land in a different manner. He purpoſes throwing one of theſe fields into the following round: 1. Cabbages. 2. Windſor beans. 3. Oats. 4. Clover. 5. Wheat. Which he apprehends will turn out more advantageous; and in this he is certainly right: for the quantity of manure ariſing from the cattle, which are maintained by the cabbages and the clover, will enrich the land to a very great degree; and in the conduct of ſuch a courſe, if all the dung ariſing from the field was duly returned to it, the exact advantage of it would be found, which otherwiſe cannot be.

Experiment, No. 35.

Culture, expences, and produce, of five acres of drilled wheat.

1768.

Culture.

The ſoil of this field is a light loam, but not light enough for feeding turnips on.

In 1767 it yielded peaſe, the ſtubble of which was ploughed up in *September*, and then thrown on to lands 3 ½ feet wide: harrowed in 3 quarters *per* acre of ſheep trotters, and drilled each land with double rows of wheat, at 14 inches, uſing one buſhel *per* acre of ſeed. The rows were once hand-hoed, and twice horſe-hoed with ſhim and double mould-board plough: the product 2 ½ quarters *per* acre.

Expences.

Firſt ploughing, -	£. 0	8	6
Second ditto, -	0	7	6
Harrowing, - -	0	1	0
Three quarters of trotters,	1	7	0
Carriage ditto, -	0	3	0
Sowing ditto, - -	0	1	6
Drilling, -	0	1	6
Seed, - -	0	5	6
Water-furrowing, - -	0	1	0
Hand-hoeing, -	0	4	0
Shim twice, - -	0	1	4
Double mould-board, -	0	2	4
Reaping, - -	0	8	0
Harveſting, -	0	3	6
Thraſhing 2 ½ quarters, -	0	7	6
Carrying, -	0	2	6
Rent, &c. - -	1	2	0
Total,	5	7	8

Produce.

Two qrs. and a half, at 52 *s.* 6 *d.*	6	11	3
Straw, one load. –	1	5	0
Total, –	7	16	3
Expences, – –	5	7	8
Profit, – –	2	8	7
Ditto on the five. –	12	2	11

Experiment, No. 36.

Culture, expences, and produce, of five acres of drilled wheat.

1768.

Culture.

The ſoil a ſtrong loam, tending to clay; the tillage, ſeed, hoeing, &c. the ſame as No. 35. The product 3 quarters *per* acre.

Expences.

As before, except thraſhing,	5	0	2
Thraſhing, – –	0	8	9
Total, –	5	8	11

Produce.

Three quarters, at 52 *s.* 6 *d.*	7	17	6
Straw, one load, –	1	5	0
Total, –	9	2	6
Expences, – –	5	8	11
Profit, – –	3	13	7

Experiment, No. 37.

Culture, expences, and produce, of ſeven acres and three roods of drilled wheat.

1770.

Culture.

The ſoil of this field is a ſtrong loam, on a brick earth. In 1768, it yielded tares, the ſtubble of which was ploughed up in *September*, twelve inches deep. In *May*, 1769, it was hunted, and ſoon after croſs-ploughed, and rolled with ſpiky roller. Ridged up half the field in *Auguſt*, in 3 ½ feet lands, and harrowed the other half with ox-harrows twice. Drilled the ridged half with a buſhel an acre of wheat, 4 rows on each land; and, as ſoon as it was finiſhed, the furrows were ſtruck with the double mould-board plough. The other half was ſown broad-caſt, 2 buſhels *per* acre, and ploughed in, after which the whole was water-furrowed.

In *February*, 16 ſacks an acre of rabbit dung ſpread over the whole. The drilled half was once hand-hoed, and the broad-caſt hand-weeded. The products — the drilled, three quarters, ſeven buſhels, one peck and ½ *per* acre; and the broad-caſt 4 quarters.

Account of the drilled.

Expences.

Firſt ploughing,	£. 0	12	0
Water-furrowing,	0	1	0
Second ditto,	0	7	6
Third ditto, twelve inch,	0	12	0
Spiky roller,	0	2	0
Fourth earth,	0	5	0
Drilling,	0	1	6
Seed,	0	6	6
Striking furrows,	0	1	2
Water-furrowing,	0	1	0
Rabbit dung and ſowing,	1	2	10
Hand-hoeing,	0	5	0
Reaping,	0	10	0
Harveſting,	0	3	6
Thraſhing,	0	12	0
Carrying,	0	2	0
Rent, &c. &c.	2	4	0
Total,	7	9	0

Produce.

3 qrs. 7 b. 1 ½ p. at 50 *s.*	9	16	0
Straw, two loads, at 25 *s.*	2	10	0
Total,	12	6	0
Expences,	7	9	0
Profit,	4	17	0

Account of the broad-caſt.

Expences.

Firſt ploughing,	£. 0	12	0
Water-ſurrowing,	0	1	0
Second earth,	0	7	6
Third ditto,	0	12	0
Spiky roller,	0	2	0
Harrowing,	0	3	0
Sowing,	0	0	3
Seed,	0	13	0
Fourth earth,	0	5	0
Water-furrowing,	0	1	0
Rabbit dung,	1	2	10
Weeding,	0	5	0
Reaping,	0	10	0
Harveſting,	0	3	6
Thraſhing,	0	12	0
Carrying out,	0	2	0
Rent,	2	4	0
Total,	7	16	1

Produce.

Four quarters, at 50*s.*	10	0	0
Straw, two loads,	2	10	0
Total,	12	10	0
Expences,	7	16	1
Profit,	4	13	11

Profit by the drilled,	£. 4	17	0
——— broad-caſt,	4	13	11
Superiority,	0	3	1

The equality of the two methods is here very remarkable; but the ſuperiority may be fairly, according to this account, given the drill, on account not only of the 3s. but alſo the ſuperior tillage the land receives in it. A hand-hoeing is far more beneficial than a weeding.

Obſervations on the preceding crops of drilled wheat.

Theſe experiments in drilled wheat include ſeveral ſeaſons, various ſoils, and ſome difference in the methods of culture: hence they cannot fail diſcovering nearly the merit of this huſbandry for wheat. I ſhall throw the trials into one view, that a clearer idea may be formed of the reſult.

		l.	s.	d.		q.	b.	p.		l.	s.	d.
Experiment, No. 29.	Expences,	5	15	8	Product,	4	0	0	Profit,	6	4	4
31.		5	15	3		3	0	0		3	12	3
33.		4	10	10		2	1	2		1	1	8
35.		5	7	8		2	4	0		2	8	7
36.		5	8	11		3	0	0		3	13	7
37.		7	9	0		3	7	1½		4	17	0
Totals,		34	7	4		18	4	3½		21	17	5
Averages,		5	14	6		3	0	3		3	12	10

This table exhibits the cleareſt circumſtances in favour of drilling wheat, that I remember to have heard of; for here is not one unprofitable crop, not one but was manured, nor one that was not well cleaned by horſe and hand-hoeing:

notwithſtanding theſe expences, which all tend much to enriching the land for following crops, yet is the neat profit ſo great as 3*l.* 12*s.* 10*d.* *per* acre; which certainly proves, in the cleareſt manner, that the methods of drilling here purſued are truly advantageous, and may be practiſed with as great a certainty of profit, as any part of the old huſbandry. It has been common with many perſons to declare againſt drilling from experience; but ſuch, it is preſumed, have practiſed Mr. *Tull*'s method of wide intervals, for drilling the ſame land every year with wheat. Mr. *Arbuthnot*'s plan has been totally different: he has ſet his rows ſo cloſe together, in ſeveral of his trials, that the field preſently reſembles a broad-caſt one. The utility of drilling lies, firſt, in his being able, with one man, two horſes, and a boy, to put in five or ſix acres in a day; whereas, in the common method of ſowing under furrow on a fallow, one plough can finiſh but one acre after the ſeedſman. Secondly, it conſiſts in the eaſy admiſſion of a hand-hoe between the rows, and the horſe-hoes in the intervals; both which operations muſt be performed while the corn is young, and are done with much greater eaſe and expedition, than is poſſible with broadcaſt crops; though many farmers, in ſome parts of *England*, find it highly advantageous to hand-hoe all their wheat. The great ſucceſs of this method is the beſt proof of its propriety; for drilling, that will pay ſo conſiderable a profit on the average of the above trials, ought to be eſteemed deciſively advantageous. The degree of benefit, which, in a long courſe, would reſult from keeping the land always clean while under wheat, cannot be accurately calculated: every crop would poſſeſs a ſhare of it, and, beyond all doubt, every one would be regularly the better.

But Mr. *Arbuthnot* here obſerves, that however advantageous theſe trials may appear, no perſon ſhould think of practiſing the drill culture of wheat, unleſs he abſolutely determines to keep the land as clean as a garden: the ſucceſs depends on keeping this reſolution. Under a more imperfect ſyſtem, drilling would probably turn out worſe than the common mode.

He further remarks, that theſe trials have been manured for often, but moderately: a conduct, which he finds much more beneficial than laying on a large quantity once in four or five years.

Theſe trials are, upon the whole, deciſive in favour of the mode of drilling here purſued, and will, for the future, prevent thoſe general expreſſions of praiſe or condemnation, which we have ſo long heard in every thing that concerns the new huſbandry.

BEANS.

Beſides the trials already regiſtered on drilled beans among the preceding crops of wheat, Mr. *Arbuthnot* has formed ſome others much deſerving attention.

Experiment, No. 38.

Culture, expences, and produce, of five acres of drilled beans.

1767.

Culture.

The ſoil a ſtrong loam, on a clay bottom, not manured for many years. In 1766, it yielded oats, the ſtubble of which was ploughed twelve inches deep in *December*, and ſo left till *April*, when it was harrowed thrice, and drilled with tick beans, two buſhels *per* acre, in double rows, at fourteen inches, with twenty-inch intervals. The end of *May* they were hand-hoed, and horſe-hoed with ſhim and double mould-board plough. In *June*, all theſe operations were repeated. After the bloſſoming, the ſhoots above the flowers were cut off with a peaſe hook, at the length of about twelve inches: this was done to forward the ripening. The product three quarters *per* acre.

Expences.

Firſt ploughing, -	£. 0	12	0
Harrowing, -	0	3	0
Drilling, - -	0	1	6
Seed, -	0	7	0
Two hand-hoeings, -	0	12	0
Shim twice, -	0	1	4
Double mould-board ditto,	0	2	8
Cutting tops, -	0	0	6
Reaping, - -	0	7	0
Harveſting,	0	4	0
Thraſhing, -	0	3	6
Rent, &c. - -	1	2	0
Total, -	3	16	6

Produce.

Three quarters, at 25*s.*	£. 3	15	0
Straw, one load, -	*1	0	0
Total, -	4	15	0
Expences, - -	3	16	6
Profit, - -	0	18	6

Experiment, No. 39.

Culture, expences, and produce, of ſix acres of drilled beans.

1768.

Culture.

The ſoil of this field is a ſtrong clay, ſummer-fallowed in 1767, receiving, in all, three earths and one harrowing. In *February*, it was drilled with a buſhel and half *per* acre of horſe-beans, in double rows, at fourteen inches, with twenty-eight inch intervals. They were hand-hoed once, and horſe-hoed with ſhim and double mould-board once. The produce three quarters *per* acre.

Expences.

Three earths, - -	1	10	0
Harrowing, -	0	1	0
Drilling, - -	0	1	6
Carry over,	1	12	6

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* It is to be obſerved, that for cart-horſes bean-ſtraw, when well got in, is as good as middling hay.

Brought over,	£. 1	12	6
Seed,	0	5	0
Water-furrowing,	0	0	6
Hand-hoeing,	0	4	0
Shim,	0	0	8
Double mould-board plough,	0	1	2
Reaping,	0	7	0
Harveſting,	0	5	0
Thraſhing, at 1 *s.* 4 *d.*	0	4	0
Rent, &c.	2	4	0
Total,	5	3	10

Produce.

Three quarters, at 28 *s.*	4	4	0
Straw, one load,	1	0	0
Total,	5	4	0
Expences,	5	3	10
Profit,	0	0	2

This is a freſh inſtance, that beans muſt always be made the fallow, and not have the expences of a preparatory one to pay; for the crop does not appear to be the better: a circumſtance fully ſufficient to decide the matter.

Experiment, No. 40.

Culture, expences, and produce, of five acres of drilled beans.

1769.

Culture.

The five acres of experiment, No. 38, were this year again drilled with beans: the wheat ſtubble that intervened ploughed at *Michaelmas*, and again in *January*. In *February* harrowed it, and drilled with two buſhels *per* acre of tick beans, in double rows of fourteen inches, with intervals of two feet. In *April*, ſhimmed the rows, and then harrowed the land acroſs. In *May*, hand-hoed the rows, and then horſe-hoed with ſhim and double mould-board plough. The crop three quarters *per* acre.

Expences.

Firſt ploughing, - -	£.	0	7	6
Water-furrowing, -		0	0	3
Second earth, - -		0	7	6
Harrowing, -		0	0	6
Drilling, -		0	1	6
Seed, - -		0	6	0
Hand-hoeing,		0	5	0
Shim twice, - -		0	1	4
Double mould-board once,		0	1	4
Reaping, - -		0	6	0
Carry over,		1	16	11

Brought over,		£. 1	16	11
Harveſting,	-	0	4	0
Thraſhing,	- -	0	4	0
Rent, &c.		1	2	0
Total,	-	3	6	11

Produce.

Three quarters, at 25*s.*	-	3	15	0
Straw, 1 ¼ load,	- -	1	5	0
Total,	-	5	0	0
Expences,	- -	3	6	11
Profit,	-	1	13	1

Experiment, No. 41.

Culture, expences, and produce, of five acres of drilled beans.

1769.

Culture.

The ſoil the ſame as No. 40; alſo the culture. The produce three quarters and a half *per* acre.

Expences.

Sundries, as before,	3	6	11

Produce.

3 ½ quarters, at 25*s.* -	£. 4	7	6
Straw, 1 ¼ load, - -	1	5	0
	5	12	6
Expences, - -	3	6	11
Profit, - -	2	5	7

Experiment, No. 42.

Culture, expences, and produce of three acres of drilled beans.

1770.

Culture.

The ſoil a ſtrong yellow loam on a clay bottom; yielded wheat in 1769. The ſtubble was ploughed in *November*; and in *February* drilled with mazagan beans in double rows, 14 inches, with intervals of 2 feet 4 inches; 3 buſhels of ſeed *per* acre. In *May* they were horſe-hoed with ſhim and double mould-board plough; and in *June* hand-hoed. Product 4 ½ quarters *per* acre.

Expences.

Ploughing, - -	£. 0	7	6
Water-furrowing, -	0	1	0
Drilling, - - -	0	1	3
Carry over,	0	9	9

Brought over -	£. 0	9	9
Seed, - - -	0	12	0
Shim, - - -	0	0	8
Double mould-board, -	0	1	2
Hand-hoeing, - -	0	6	0
Pulling and binding, -	0	10	0
Harveſting, - - -	0	3	0
Thraſhing, - - -	0	5	0
Rent, - - -	1	2	0
	3	9	7

Produce.

4 ½ Quarters, at 32 *s.* -	7	4	0
Straw, 1 ½ load, - -	1	10	0
	8	14	0
Expences, -	3	9	7
Profit, -	5	4	5

Experiment, No. 43.

Culture, expences, and produce of three acres of drilled beans.

1770.

Culture.

The ſoil a very ſtiff yellow clay; cropped with wheat in 1769; the ſtubble ploughed at *Chriſtmas* and harrowed. In

February it was ſet with mazagan beans, 3 ½ buſhels *per* acre. It was hand-hoed once, and horſe-hoed with ſhim and double mould-board once. Produce, 4 ½ quarters *per* acre.

Expences.

Ploughing,	£. 0	7	6
Harrowing,	0	1	0
Setting,	0	7	0
Seed,	0	14	0
Hand-hoeing,	0	10	0
Shim,	0	0	8
Double mould-board,	0	1	2
Pulling and binding,	0	10	0
Harveſting,	0	10	0
Thraſhing,	0	5	0
Rent, &c.	1	2	0
	4	8	4

Produce.

4 ½ Quarters, at 32 *s.*	7	4	0
Straw, one load,	1	0	0
	8	4	0
Expences,	4	8	4
Profit,	3	15	8

Experiment, No. 44.

Culture, expences, and produce of four acres of drilled beans.

1770.

Culture.

The ſoil a good ſandy loam on clay: cropped with wheat in 1769; the ſtubble trench ploughed with *Ducket*'s plough, 10 inches deep, in *October*. In *November* it was harrowed, and drilled with mazagan beans in double rows, 14 inches aſunder, with 18 inch intervals: 4 buſhels of ſeed. In *April* they were hand-hoed, and then ſhimmed; and the beginning of *June* hand-hoed and ſhimmed again. Produce, 4 ½ quarters *per* acre.

Expences.

Ploughing, - -	£. 0	12	0
Harrowing, - -	0	1	0
Drilling, - - -	0	1	6
Seed, - - - -	0	6	0
Water-furrowing, - -	0	1	3
Twice hand-hoeing, -	0	8	6
Shim twice, - -	0	1	4
Pulling and binding, -	0	10	0
Harveſting, - - -	0	4	0
Carry over, -	2	15	7

Brought over,	£. 2	15	7
Thraſhing,	0	5	0
Rent,	1	2	0
	4	2	7
Produce.			
4 ½ Quarters, at 32 *s.*	7	4	0
Straw, 1 ¼ load,	1	5	0
	8	9	0
Expences,	4	2	7
Profit,	4	6	5

General obſervations.

Theſe experiments on beans including many variations of ſoil, culture, and ſort, the concluſions to be drawn from them will appear with the greater clearneſs, by forming a table of averages as before done with the wheat crops.

			l.	s.	d.		q.	b.	p.		l.	s.	d.
Experiment, No.	28.	Expences,	3	19	6	Product,	3	4	0	Profit,	2	1	6
	30.		3	10	8		3	0	0		2	19	4
	32.		6	1	4		3	4	0	Loſs,	0	3	4
	34.		3	10	6		3	4	0	Profit,	4	9	6
	38.		3	16	6		3	0	0		0	18	6
	39.		5	3	10		3	0	0		0	0	2
	40.		3	6	11		3	0	0		1	13	1
	41.		3	6	11		3	4	0		2	5	7
	42.		3	9	7		4	4	0		5	4	5
	43.		4	8	4		4	4	0		3	15	8
	44.		4	2	7		4	4	0		4	6	5
Totals,			44	16	8		39	4	0		27	17	6
										Loſs,	0	3	4
										Profit,	27	10	10
Averages,			4	1	6		3	4	2		2	10	0

The clear profit of 2 *l.* 10 *s.* an acre on ſuch a variety of crops, moſt of which are mere fallows for wheat, is much more conſiderable than attends the bean culture throughout nine tenths of the kingdom. This great ſuperiority is owing to the uncommon attention to keeping them perfectly clean by hand and horſe-hoeing; drilling gives a fair opportunity for exerting culture of this ſort; and it is evident from the crops, how much benefit they reap by this conduct. Common farmers do not make near ſuch a profit by wheat. What therefore can thoſe counties ſay to this, who continue in the abſurd courſe of, 1. Fallow; 2. Wheat; 3. Beans? Let them peruſe theſe experiments with candor: Let them try the reſult: It is impoſſible but they muſt acknowledge the infinite ſuperiority.

PEASE.

Experiment, No. 45.

Culture, expences, and produce of five acres of drilled peaſe.

1767.

Culture.

The ſoil of this field is a poor ſandy loam. It yielded wheat in 1766; the ſtubble of which was ploughed 12 inches deep in *December*. In *April* ox-harrowed and croſs ploughed, and then harrowed twice more; after which it was ridged up in 3 ½ feet lands; and being harrowed once were drilled in double rows, at 14 inches; the interval 2 feet 4 inches, with 1 ½ buſhel *per* acre of dwarf marrowfat peaſe. In *May* they were hand-hoed, and horſe-hoed with ſhim and double mould-board plough. In *June* theſe three operations were repeated. The crop 14 buſhels *per* acre.

Expences.

Firſt ploughing, - -	£. 0	12	0
Harrowing, - -	0	2	0
Second ploughing, - -	0	7	6
Harrowing, - - -	0	1	0
Third ploughing, - -	0	6	0
Harrowing, - - -	0	0	6
Drilling, - - -	0	1	6
1 ½ Buſhel ſeed, - -	0	12	0
Two hand-hoeings, - -	0	10	0
Shim twice, - - -	0	1	4
Double mould-board plough ditto,	0	2	8
Hooking, - -	0	6	0
Harveſting, - -	0	4	0
Thraſhing, - -	0	2	4
Carry over,	3	8	10

	£.	s.	d.
Brought over, -	£.3	8	10
Carrying out, - -	0	1	0
Rent, &c. - -	1	2	0
	4	11	10

Produce.

	£.	s.	d.
14 Buſhels, at 6*s.* 6*d.* -	4	11	0
½ Load ſtraw, at 15*s.* -	0	7	6
	4	18	6
Expences, - -	4	11	10
Profit, - - -	0	6	8

Experiment, No. 46.

Culture, expences, and produce of two acres of drilled peaſe.

1767.

Culture.

The ſoil a ſandy loam on a brick earth; ſummer fallowed in 1766, when it received four ploughings and two ox-harrowings; being left on the 4 foot ridge by the laſt earth in autumn. It would not have been ſummer fallowed, but was deſigned for madder, only the plants fell ſhort. In *April* the ridges were reverſed by a ploughing, 10 inches deep. It was then harrowed; and about the end of *May* drilled with 2 buſhels an acre of blue union peaſe, in double rows, of 14 inches, and 2 feet 10 inch intervals. They were once hand-hoed, and horſe-hoed with ſhim and double mould-board once. They were ſold green in *September*. The product 10 ſacks *per* acre, at 7*s*. a ſack.

Expences.

1766.	Four ploughings, -	£. 1	12	6
	Two ox-harrowings,	0	2	0
1767.	Ploughing, -	0	10	0
	Harrowing, -	0	0	6
	Drilling, -	0	1	6
	2 Buſhels ſeed, -	0	14	0
	Hand-hoeing, -	0	6	0
	Shim, - -	0	0	8
	Double mould-board,	0	1	2
	Rent, - -	2	4	0
		5	12	4

Produce.

10 Sacks, at 7*s*	£. 3	10	0			
Straw, - -	1	0	0			
				4	10	0
Loſs, - -				1	2	4

Experiment, No. 47.

Culture, expences, and produce of four acres of drilled peaſe.

1768.

Culture.

Soil, a ſandy loam, was cropped with oats in 1767; the ſtubble of which was ploughed up in *January*. Croſs ploughed the beginning of *April*, and harrowed twice. Manured it with 10 loads an acre of *London* dung, which were ploughed in and the land harrowed. It was then landed up on to 3 ½ feet ridges, harrowed, and drilled with dwarf marrowfat peaſe, 1 ½ buſhel an acre, in double rows, at 14 inches, with intervals of 2 feet 4 inches. They were once hand-hoed, and horſe-hoed twice with ſhim, and once with the double mould-board plough. The crop was ſold on the land for pods, at 3*l.* an acre, but extremely blighted.

Expences.

Firſt ploughing, -	£. 0	7	6
Second ditto, -	0	7	6
Harrowing, - -	0	2	0
10 Loads dung, (54 buſhels each) at 10*s.* - -	5	0	0
Third ploughing, -	0	4	6
Carry over, -	6	1	6

Brought over,				£. 6	1	6
Harrowing,				0	0	6
Fourth ploughing,				0	4	6
Harrowing,				0	0	6
Drilling,				0	1	6
1 ½ Buſhel ſeed,				0	10	6
Hand-hoeing,				0	5	0
Shim,				0	1	4
Double mould-board plough,				0	1	2
Rent, &c.				1	2	0
				8	8	6
Produce.						
Crop,	£. 3	0	0			
Straw,	0	15	0			
				3	15	0
Loſs,				4	13	6

General obſervations.

The ſucceſs of drilling peaſe has proved very bad in theſe trials, and yet the attention given the crops was by no means deficient. The moſt proper fields in the farm were choſen, and no omiſſions were made in the cleaning them while growing. The event does not condemn the drill culture of this vegetable, becauſe the trials are not numerous, and were confined to two ſorts of pea only; neither of which is much cultivated any where, except in the neighbourhood of *London*.

Experiment, No.	46.	Loſs,	£. 1	2	4
	47.	Ditto,	4	13	6
			5	15	10
	45.	Profit,	0	6	8
Total loſs,		-	5	9	2
Average,	-	-	1	16	4

It would be prepoſterous to aſſert, from the above experiments, that theſe peaſe cannot be profitably cultivated: at the ſame time it ſhould be remarked, that the great advantages to be expected depend on accidental circumſtances, particularly on the price being high at market, But even in that caſe, the gentleman, who cannot attend the ſale, muſt not expect the profit of gardeners. This laſt circumſtance, attended with the uncertainties of the crop, has made Mr. *Arbuthnot* determine to leave it out of his courſe, and ſubſtitute beans, which he can conſume himſelf, or always find a ready market for.

He entertains no doubts concerning the

propriety of drilling peaſe from the preceding ill ſucceſs; on the contrary, in caſe he cultivates them in future, he is fully determined never to ſow them in any other manner; not only from the conviction of his reaſon, but alſo from various obſervations. He recommends for ſmall peaſe, double rows, at 14 inches, with 2 feet intervals; the two rows ſhould, while young, be thrown ſo much together by the double mould-board plough, as to ſeem to form but one row: but great care muſt be taken to do it early enough to avoid breaking the haulm. The weeds had better get up, than the vine be diſturbed when of any growth.

TURNIPS.

Experiment, No. 48.

Culture, expences, and produce of four acres of drilled turnips.

1768

Culture.

The pea ſtubble of Experiment, No. 47. was ploughed up immediately after gathering: the whole was then dunged again with 10 loads an acre from the farm yard; which was then turned in by another ploughing, throwing it on to 4 feet lands; after harrowing they were part drilled; one acre with common turnips broad-caſt, and 3 acres drilled with *Reynold's* turnip; double rows, at 14 inches, with 2 feet 4 inch interval; both the beginning of *Auguſt*. They were once hand-hoed, but horſe-hoeing was prevented by wet. The common turnips were conſumed by ewes and lambs, and were worth 3 *l*. The others were fed off in *April*; the 3 acres kept 140 ewes and 140 lambs a fortnight; worth 3 *d*. a couple *per* week. They eat them greedily; when pared down to the ground they were taken up with turnip hooks, and the ſheep eat them clean. The weight of the plants did not exceed ¾ of a *lb*. tops and all: The ſhoots were 2 feet high the middle of *April*.

Account of the turnips.

Expences.

Furrowing, - -	£. 0	3	0
Manuring, 10 loads, at 6 *s*. -	3	0	0
Ploughing, - -	0	7	6
Harrowing, - - -	0	1	0
Sowing and ſeed, - -	0	1	0
Hand-hoeing, - -	0	6	0
	3	18	6

Brought over, total expences, £.	3	18	6

Produce.

Value of the crop,	3	0	0
Loſs,	0	18	6

Account of *Reynolds*'s turnips.

Expences.

Furrowing,	0	3	0
Manuring,	3	0	0
Ploughing,	0	7	6
Harrowing,	0	1	0
Drilling,	0	1	6
Seed,	0	1	6
Hand-hoeing,	0	7	0
	4	1	6

Produce.

By keeping 140 ſheep 2 weeks, at 3*d.* 3*l.* 10*s.*; the third of which is,	1	3	4
Loſs,	2	18	2
Ditto by common turnips,	0	18	6
Exceſs of the former,	1	19	8

Obſervations.

This experiment is not offered as a full compariſon between the two plants, becauſe *Auguſt* is too late for either, and particularly ſo for the cabbage turnip, which is directed to be ſown in *March*, and planted in *June*; it had not therefore a fair trial; but it is of no ſlight conſequence to know that the common turnip will yield ſo large a produce as 3 *l.* an acre from ſo late a ſowing; and at the ſame time that the other plant will then produce but a trifling crop: this is evidently proved: a crop of turnips of 3 *l.* after peaſe of the ſame year, is highly beneficial.

Experiment, No. 49.

Culture, expences, and produce, of two acres of drilled turnips.

1768.

Culture.

Two acres of ſtrong loam, on brick earth, yielded drilled peaſe in 1767; the ſtubble ploughed in *October*, and the land water-furrowed. In *April*, it was ſtirred again and harrowed. After this, it was left till *June*, when it received another ploughing and harrowing: the 30th, drilled it in double rows, at fourteen inches, with two feet ten inch intervals. As ſoon as the plants came up, ſix ſacks *per* acre of wood aſhes were ſown over them, not only as a manure, but to preſerve them from the fly. They were hand-hoed twice, and horſe hoed with ſhim and double mould-board plough as often. The conſumption of the crop was as follows: an high head-land on one ſide the field was ploughed twelve inches deep, and the ſheep folded on it, after being well littered with ſtraw: the turnips were then given in cribs: the two acres kept 164 ſheep and lambs ſix weeks and two days; they were turned out of the pen at noon: the value of the keeping 2 *d.* a week.

Expences.

Firſt ploughing,	-	£.	0	7	6
Water-furrowing,	-		0	0	3
Second ploughing,	-		0	6	0
Harrowing,	-		0	1	0
Third ploughing,	-		0	6	0
Carry over,	-		1	0	9

Brought over, - £.	1	0	9
Drilling, - -	0	1	6
Seed, - -	0	0	4
Wood aſhes and ſowing, -	0	6	0
Hand-hoeing twice, -	0	8	0
Shim twice, - -	0	1	4
Double mould-board plough ditto,	0	2	0
Carting to the fold, -	0	15	4
Rent, - -	1	2	0
Total,	3	18	3
Produce.			
Keeping 164 ſheep ſix weeks and two days, at 2*d.* 4*l.* 2*s.*; the half is -	2	1	0
Loſs, - -	1	17	3

Experiment, No. 50.

Culture, expences, and produce, of three acres of drilled turnips.

1770.

Culture.

This piece yielded turnips in 1769, and was deſigned for madder, but plants were wanting: trench-ploughed it in *June*, and drilled it the 10th of *July*; part in rows, equally diſtant, three feet, with rows of lucerne between. They were twice hand-hoed, and ſhimmed three times: the lucerne was deſtroyed by the fly, before they began the turnips, the latter being ſaved by burning weeds. The rows, at 18 inches, were attacked by a grey grub; ſoot was ſown to kill them; but had no effect. Part of this piece is a gravelly ſoil; and it is remarkable, that the grub eat only thoſe parts; this was probably owing to the more luxuriant growth of the reſt of the field. The eighteen-inch rows were only hand-hoed, as theſe intervals would not admit the horſe-hoe, without danger of burying the plants.

Expences.

Ploughing, -	£.	0	10	0
Harrowing, -		0	1	0
Drilling, - -		0	0	6
Seed, - -		0	0	2
Hand-hoeing twice, -		0	9	0
Shim twice, - -		0	1	4
Rent, &c - -		1	2	0
Total, -		2	4	0

One ſquare perch, the beſt that could be found among the eighteen-inch rows, was pulled and weighed, - -	210 *lb.*
One ſquare perch of the three-feet rows weighed, - -	244
Superiority, - -	34

N. B. The perch of the three-feet rows was not near ſo good as what had been drawn for the ſheep before this experiment was made.

Experiment, No. 51.

Culture, expences and produce, of one acre of drilled turnips.

1770

Culture.

The ſoil of this acre is a rich, deep black mould: it was ſummer fallowed in 1769, when it received two earths. In *May* it was ploughed again, and well harrowed in *June* another earth was given, and freſh harrowing. It was then manured with nine loads an acre of freſh yard dung, which was ploughed in, and the land again harrowed. It was then drilled with turnips, in rows equally diſtant, two feet aſunder, and twice hand-hoed. Theſe are to be tranſplanted, to ſtand for ſeed: they are to be planted in equidiſtant rows, three feet and an half aſunder, and are to be at two feet diſtance in the rows.

Expences.

1769.	Two ploughings,	0	12	0
1770.	Third earth,	0	6	0
	Harrowing,	0	1	0
	Fourth earth,	0	4	6
	Harrowing,	0	1	0
	Manuring,	2	14	0
	Fifth earth,	0	4	6
	Harrowing,	0	1	0
	Drilling,	0	2	0
	Seed,	0	0	6
	Twice hand-hoeing,	0	10	0
	Rent, &c.	2	4	0
	Total,	7	0	6

Obſervations.

The experiment, No. 50, ſhews the great advantage of horſe-hoeing turnips, which could not be performed in the eighteen-inch rows without danger of burying the plants; but Mr. *Arbuthnot* is of opinion, that two-feet rows will admit of ſufficient culture with the horſe-hoe, and produce a larger crop than in rows at three feet diſtance.

PREVENTING THE FLY.

Mr. *Arbuthnot* has tried various receipt to deſtroy the turnip fly; but none of them have anſwered, except the following.

He collects all ſorts of green weeds from hedges, hedge-rows, &c. mixes them with ſtraw, and lays them on heaps on the windward ſide of the field: they are then ſet on fire, ſo that the wind may blow the ſmoak over the whole field. But it ſhould be obſerved, that the weeds muſt not be withered too much, as it is the ſmothering of the flame that produces the ſmoak, which is expected to have the deſired effect. This drives away the fly at once, and ſaves the crop: he this year preſerved ten acres, on which the fly had begun, by purſuing this method: they were ſafe in three or four days. This hint he received from Mr. *Booth*, of *Glendon*, in *Northamptonſhire*.

C. A. B.

CABBAGES.

Experiment, No. 52.

Culture, expences, and produce, of four acres of cabbages.

1769.

Culture.

The ſoil a ſandy loam, on brick earth. In 1768 it yielded barley, the ſtubble of which was ploughed up the 12th of *September*, 14 inches deep, with the great wheel plough, and twice harrowed. It was then planted with various ſorts of gardeners cabbages: the rows equally diſtant, at 18 inches and two feet, and the plants one foot aſunder in the rows: they were once hand-hoed: three acres were fed off with ewes and lambs: they maintained 270 ewes, and 70 lambs, a fortnight, in *April* and *May*, at 3*d.* a week. N. B. A very mild winter from *Michaelmas* to *Chriſtmas*. The other acre was ſold to *Covent-Garden* by the bunch; from ſix to twelve in a bunch, at 3*d.* At two feet by one, there are 21780 plants on an acre, which, at ten for 3*d.* come to 27*l.* 4*s.* 6*d.*

Expences

Expences.

Ploughing,	£. 0	14	0
Harrowing,	0	1	0
Planting,	0	12	0
Seed, and ſeed-bed, &c.	0	7	0
Hand-hoeing,	0	7	0
Water-furrowing,	0	0	6
Rent, &c.	1	2	0
Total,	3	3	6

Produce.

Keeping 350 ſheep, at 3*d.* is 8*l.* 15*s.* 8*d.* or *per* acre,	2	18	6
Loſs,	0	5	0

Experiment, No. 53.

Culture, expences, and produce of a rood of cabbages.

1770.

Culture.

The ſoil ſtrong loam on clay, fallowed in 1769; manured with twelve loads an acre of yard dung; in *October* ridged into four feet lands; harrowed the beginning of *May*, and the 8th planted, two rows, equally diſtant, one foot from plant to plant. They have been twice hand-hoed, once with ſhim, and once with the double mould board plough.

Expences.

1769.	Three ploughings,	£. 1	2	6
1770.	Manuring, -	3	12	0
	Harrowing, -	0	1	0
	Fourth ploughing,	0	6	0
	Harrowing, -	0	1	0
	Planting, -	0	5	0
	Two hand-hoeings,	0	7	0
	Shim, -	0	0	8
	Double mould-board plough	0	1	2
	Rent, &c. -	2	4	0
	Total, - -	8	0	4

Experiment, No. 54.

Culture and expences of a rood of cabbages.

1770.

Culture.

The proportion and management of this rood the ſame as the preceding, only it was drilled when the ridges of the other were planted; the great *Scotch* cabbage ſeed, double rows on each ridge. Some rows planted. Other lands were at the ſame time drilled with a cabbage from *Northamptonſhire* a ſugar-loaf ſort, ſoft, and of a pale a pale green. *May* 29, hand-hoed, but did not ſet them out. *June* 6, the plants were pricked out from the drills, leaving the remainder two feet apart: then all were hand-hoed. *June* 28, the drilled beds were horſe-hoed, and the furrows ſtruck with double mould-board plough. *July* 16, the plants that were pricked out were tranſplanted for good. *Auguſt* 2, the tranſplanted were hand and horſe-hoed, and the drills the ſame. The 24th, both were horſe-hoed, and earthed up, with double mould-board plough. *November* 5, the beſt *Scotch* was picked out of the drilled:

he weighed, –	20½ *lb.*
A *Northampton* ditto, – –	13½
A *Scotch* tranſplanted, – –	10½
A *Northampton* ditto, –	8

The drilled being in a diſtant field, many were ſtolen: they were therefore obliged to be conſumed: it could not therefore be known how long they would ſtand the winter.

The *Northampton* ſort much the forwardeſt: a proof that they will not laſt ſo well.

Expences.

		£.	s.	d.
1769.	Three ploughings,	3	12	0
	Harrowing,	0	1	0
	Fourth ploughing,	0	6	0
	Harrowing,	0	1	0
	Drilling,	0	1	0
	Seed,	0	2	0
	Thrice hand-hoeing,	0	10	0
	Shim,	0	1	4
	Double mould-board,	0	2	4
	Rent, &c.	2	4	0
	Total,	7	0	8

Experiment, No. 55.

Culture and expences of three roods of cabbages.

1770.

Culture.

The land a rich turnip ſoil. In 1769, it yielded madder, which was taken up in the ſpring of 1770, ploughed in *April*, and harrowed; then drew furrows four feet aſunder, in which madder was planted, on a dreſſing of rabbit dung, 60 ſacks *per* acre. The beginning of *June* it was taken up again, the plants being wanted for another place: the 16th of *July*, *Scotch* and *North-*

Northamptonſhire cabbage-plants were ſet in the furrows after being new drawn; the rows four feet by two from plant to plant: they have been horſe-hoed with the ſhim thrice, and with the double mould-board twice, beſides two hand-hoeings: the laſt was for drawing in the earth, after the double mould-board, to the plants.

Expences.

Firſt ploughing,	£. 0	7	0
Harrowing,	0	1	0
Manuring,	3	10	0
Drawing furrows,	0	0	6
Planting,	0	5	0
Shim thrice,	0	2	0
Double mould-board twice,	0	2	4
Two hand-hoeings,	0	6	0
Rent, &c.	1	2	0
Total,	5	15	10

Experiment, No. 56.

Culture and expences of one acre of cabbages.

1770.

Culture.

The ſoil a deep black mould, fallowed in 1769, being ploughed five times; again in *April*, 1770, when it was alſo ox-harrowed four times in a place; ſtirred again in *May*, and again harrowed; another ploughing in *June*, and two harrowings; manured with nine loads an acre of yard dung; ploughed it in, and harrowed again; ſtruck the furrows, and planted with cabbages three feet by two. They have been twice hand-hoed, and ſhimmed once.

Expences.

1769.	Five earths,	£. 1	10	0
1770.	Sixth ditto,	0	6	0
	Harrowing,	0	4	0
	Seventh earth,	0	6	0
	Harrowing,	0	4	0
	Eighth earth,	0	5	0
	Harrowing,	0	1	0
	Manuring,	2	15	6
	Ninth earth,	0	5	0
	Harrowing,	0	1	0
	Striking furrows.	0	1	6
	Planting,	0	8	0
	Hand-hoeing,	0	6	0
	Shim,	0	0	8
	Rent, -&c.	2	4	0
	Total,	8	17	8

BARLEY.

Experiment, No. 57.

Culture, expences, and produce of four acres and a half of drilled barley.

1767.

Culture.

The ſoil of this field is a very ſtrong clayey loam: it was cropped with wheat in 1766, the ſtubble of which was ploughed up at *Michaelmas*. In *April* it was ſlit down and harrowed, after which it was landed up in four-feet ridges, and drilled, double rows, at fourteen inches, on each ridge; one buſhel and a half of ſeed *per* acre. It was twice horſe-hoed with ſhim, and thrice with the double mould-board plough. The product two quarters and a half *per* acre.

Expenſes.

Firſt ploughing,	£. 0	8	6
Second ditto,	0	6	0
Harrowing,	0	1	0
Third ploughing,	0	4	6
Drilling,	0	1	6
Seed,	0	4	6
Carry over,	1	6	0

	£.	s.	d.
Brought over, -	1	6	0
Shim twice, -	0	1	4
Double mould-board thrice,	0	3	6
Reaping, - -	0	5	0
Harveſting, -	0	3	6
Thraſhing, - -	0	4	2
Rent, &c. - -	1	2	0
Carrying out,	0	0	6
Total, -	3	7	0

Produce.

Two quarters and a half, at 26 *s.*	3	5	0
Straw, one load, -	0	16	0
Total, -	4	1	0
Expences, -	3	7	0
Profit, - -	0	14	0

Experiment, No. 58.

Culture, expences, and produce of two acres.

1767.

Culture.

The ſoil a ſtrong loam; yielded oats in 1766; the ſtubble ploughed in lands in autumn; in the ſpring the lands were reverſed, and one acre drilled, double rows, on three-feet ridges, uſing one buſhel of ſeed; the other acre was ſown broad-caſt, three buſhels *per* acre; the drilled was once hand-hoed, once weeded, and horſe-hoed twice, with ſhim, and as often with double mould-board. Product of the broad-caſt twelve buſhels; of the drilled ten.

Account of the broad-caſt.

Expences.

Firſt ploughing,	£. 0	10	0
Water-furrowing,	0	1	0
Second earth,	0	7	6
Sowing,	0	0	3
Seed,	0	9	0
Mowing,	0	2	0
Harveſting,	0	4	0
Thraſhing,	0	2	3
Carrying out,	0	1	0
Rent,	1	2	0
Total,	2	19	0

Produce.

Twelve buſhels, at 30 *s.*	£. 2	5	0
Straw, one load,	0	16	0
Total,	3	1	0
Expences,	2	19	0
Profit,	0	2	0

Account of the drilled.

Expences.

Firſt and ſecond earth, and water-furrowing,	£. 0	18	6
Drilling,	0	1	6
Seed,	0	3	0
Hand-hoeing,	0	4	0
Weeding,	0	4	0
Shim twice,	0	1	4
Double mould-board ditto,	0	2	4
Reaping,	0	4	0
Harveſting,	0	3	0
Thraſhing,	0	1	10
Carrying out,	0	0	10
Rent,	1	2	0
Total,	3	6	4

Produce.

10 Buſhels,	1	17	6
Straw $\frac{3}{4}$ load,	0	12	0
Total,	2	9	6

Expences,	3	6	4
Produce,	2	9	6
Loſs,	0	16	10
Profit by broad-caſt,	0	2	0
Superiority,	0	18	10

Obſervations.

This is a very fair compariſon of the two methods in the culture of barley, and the reſult clearly deciſive in favour of the broad-caſt; but the extreme poverty of the produce not exceeding 12 buſhels an acre, which for barley is a paltry crop, ſhews that drilling at theſe diſtances will by no means anſwer. Inſtead of 12, the common huſbandry ought to have yielded three times 12 buſhels. If barley is drilled, it certainly muſt be in very cloſe rows, or it cannot anſwer. This crop was in the proportion of ſingle rows at 18 inches, a width perhaps ſufficient for beans. The profit of No. 58, at a wider diſtance, is ſomewhat an exception to this remark; but 14*s.* an acre bears no proportion to the advantage of a good bread-caſt crop.

Experiment, No. 60.

Culture, expences and produce, of five acres of drilled barley.

1767.

Culture.

The ſoil a ſtrong loam on clay; ſummer fallowed in 1766, receiving five ploughings. In *April*, 1767, ſtirred again, and after twice harrowing, drilled with barley, double rows, at 14 inches, on 5 ½ feet lands, uſing one buſhel of ſeed *per* acre. It was once hand-hoed, once weeded, and horſe-hoed with ſhim and double mould-board four times; product two quarters an acre.

Expences.

1766.	Five earths, —	£. 1	17	6
1767.	Sixth, — —	0	7	6
	Harrowing, —	0	1	0
	Drilling, — —	0	1	6
	Seed, — —	0	3	0
	Water-furrowing,	0	0	6
	Hand-hoeing, —	0	5	0
	Weeding, —	0	5	0
	Shim four times, —	0	2	8
	Double mould-board ditto,	0	4	8
	Reaping, — —	0	5	0
	Harveſting, —	0	3	0
	Thraſhing, —	0	3	0
	Carrying out, —	0	1	0
	Rent, — —	2	4	0
	Total, —	6	4	4

Produce.

2 Quarters, at 32*s.* —	3	4	0
Straw 3 quarters of a load,	0	12	0
Total, — —	3	16	0

Expences,	£. 6	4	4
Produce,	3	16	0
Loſs,	2	8	4

Obſervations.

Every perſon muſt be ſenſible, that ſuch excellent tillage as this field received, would, in the broad-caſt method, have yielded a very conſiderable crop of barley; but all theſe advantages are unable to do it with drilling at wide intervals. It is ſufficiently evident, that this mode of culture is improper for barley, unleſs the rows are very near each other. Mr. *Arbuthnot* concludes from theſe trials, that barley muſt be excluded from the liſt of drill crops, unleſs in very narrow intervals, which will juſt admit the hand-hoe.

POTATOES.

Experiment, No. 61.

Culture, expences and produce, of three roods of potatoes.

1769.

Culture.

The ſoil a ſtrong loam on clay; yielded beans in 1768, on land 3 ½ feet wide. Slit them down in *October* very deep; the end of *March* ploughed them back again, and harrowed and dunged the furrows with 15 loads an acre of yard dung. The land would have been planted early, but Mr. *Arbuthnot* could not get the *Howard* potatoe till the beginning of *May*: he then had a ſack of them from Mr. *Howard* of *Greyſtock*. The ſets were laid on the dung, one row in a furrow, and one foot aſunder; covered them with the double plough, turning a furrow from each ſide the land, which was ſuffered to remain till the ſhoots appeared. When a few inches above ground, the land was ploughed down to them, which wa repeated till the centers of the old ridges became the furrows. After this they were once hand-hoed, horſe-hoed thrice with the ſhim, and thrice with the double mould-board plough. In *October* they were dug up with prongs; product 102 buſhels, each 80 *lb*. Many of them were very large, and the ſize in general improved. They were ſent to *Covent-Garden* and other markets; but nobody would purchaſe them. It was aſſerted, that the ſort had been tried and they would not boil well. Some were however ſold at laſt for ſets, the reſt given to cows and hogs: the cows had them inſtead of hay, and eat them very greedily. Porkers were fattened on ſome, boiled and maſhed, with a little barley meal mixed. In ſtating the proportions *per* acre, I ſhall ſuppoſe a value for feeding cattle; for inſtance, 2*s.* 6*d.* a buſhel.

Expences.

	£.	s.	d.
Firſt ploughing,	0	8	6
Second ditto,	0	4	6
Harrowing,	0	1	0
Manuring,	4	10	0
Five buſhels ſets,	0	12	6
Slicing and planting,	0	5	0
Covering,	0	2	6
Earthing twice,	0	5	0
Hand-hoeing,	0	4	0
Shim thrice,	0	2	0
Double mould-board ditto,	0	3	6
Digging up,	0	8	0
Carting home, &c.	0	5	0
Total,	7	11	6
Rent, &c.	1	2	0
	8	13	6

Produce.

136 Buſhels, at 2 *s.* 6 *d.* -	£.	17	0	0
Expences, -		8	13	6
Profit, - - -		8	6	6

Obſervations.

There can be little doubt but potatoes are worth 2 *s.* 6 *d.* a buſhel, of 80 *lb.* for feeding cattle; and at that rate, the profit of this experiment is very conſiderable. The expences run high from the manuring and ſuch repeated cleaning; which are circumſtances very advantageous to the ſucceeding crops; and yet the balance is 8 *l.* 6 *s.* 6 *d.*; far more than could have been gained by any corn crop. But there is another circumſtance much worthy of noting, which is, the crop being planted ſo late as *May*; a ſeaſon utterly improper for planting potatoes: this was undoubtedly a great drawback from the product, which from an earlier planting would certainly have been more conſiderable. As to the root not being ſo marketable as other ſorts, (ſuppoſing it true) I eſteem it a matter of ſmall conſequence: the great object in cultivating potatoes is not *Covent Garden*, but the food of cattle: the firſt is very confined, but the latter is univerſal.

V EXPERIMENTS TO ASCERTAIN THE BEST COURSE OF CROPS.

In the range of experimental huſbandry, there is nothing demands greater attention than the courſe of crops: the adapting a proper ſucceſſion to each ſoil, is the great object of rural œconomics. It is of very little conſequence to be able to cultivate any crop ſingly, ever ſo well, unleſs it unites properly with others to form a courſe beneficial upon the whole. When many fields have been cropped extremely different, and regiſters kept of them; there muſt appear from a general view, ſtrong reaſons for concluding ſome courſes much more beneficial than others.

To aſſert that the arranging of crops muſt be a matter of chance, accident, or caprice, would be abſolutely abſurd: It is true, no man can ſay, I will, in ſpite of ſeaſons, ſow a field with ſuch or ſuch grain; but in thirty nine inſtances out of forty, he has it in his power to chuſe. A field is ſowing with barley—ſhall I throw in clover, or let it alone? A field has yielded wheat; ſhall I take a crop of barley, or turnips? If a man knows not which courſe is moſt advantageous, what egregious blunders will he commit? We ſee theſe blunders committed every day through whole counties; and all for a want of poſſeſſing the requiſite knowledge in this material point. They who ſow four or five ſucceſſive crops of white corn, know not this part of huſbandry; but ſurely we may aſſert that there are fixed and determined courſes, not a little worthy the attention of ſuch men; inſtead of ſuppoſing that the whole is a matter in which farmers will neceſſarily judge right.

The method here purſued, is to ſtate the crops yielded by certain fields; and after ſtriking a balance of profit and loſs, to compare them together, to diſcover which fields have been moſt profitable, and in what degree owing to variations of crops.

Experiment, No. 62.

Courſe—Graſs ploughed for

1. Peaſe
2. Winter tares
3. Fallow
4. Wheat.

Three acres; the ſoil a ſtrong loam on clay.

1767.

Ploughed up the lay for peaſe; the crop 10 buſhels an acre.

Expences.

Ploughing, - -	£.0	8	6
3 Buſhels ſeed, - -	0	9	0
Sowing, - -	0	0	3
Harrowing, - -	0	1	6
Water-furrowing, -	0	1	0
Topping thiſtles, -	0	0	6
Cutting, - -	0	3	0
Harveſting, - -	0	2	0
Thraſhing 10 buſhels, -	0	3	4
Rent, &c. - -	1	2	0
	2	11	1

Produce.

10 Buſhels, at 30*s.*	£.1	17	6			
Straw, - -	0	12	0			
				2	9	6
Loſs, - -				0	1	7

1768.

Sowed winter tares - eaten by horſes in ſoiling in the ſtable; began in *June*: the three acres kept 10 horſes 6 weeks, at 7*s.* *per* horſe *per* week; which 7*s.* was calculated by the ſaving in oats and hay.

1 Buſhel of oats,	£. 0	2	6
3 ½ Truſs of hay,	0	4	8
	0	7	2

Expences.

Ploughing with 4 horſes,	0	9	0
Sowing,	0	0	3
Seed, 2 buſhels,	0	10	0
Harrowing,	0	1	6
Striking furrows,	0	0	9
Water-furrowing,	0	1	0
Mowing and carrying. *N. B.* This was done by the carter, therefore coſt nothing; but as he might be employed about other work, where the food dry meat, I charge	0	5	0
Rent,	1	2	0
	2	9	6

Produce.

Keeping 10 horſes 6 weeks, at *7s.* — 21 *l.* the three acres, or *per* acre,	7	0	0
Expences,	2	9	6
Profit,	4	10	6

1769.

It was then intended for wheat, but the black bent came ſo thick after ploughing, that it was ridged up for ſome other crop. From the middle of *April* till *June*, the black bent was fed with ſheep, by lodging them in it from a common. After this it was fallowed, and in *October* ſown with wheat; the crop 4 quarters an acre.

Expences.

Firſt ploughing, – –	0	7	6
Harrowing, – –	0	1	0
Landing up with double mould-board plough, – –	0	2	1
Water-furrows,	0	1	0
Second ploughing 12 inches deep,	0	12	0
Third, hunting down, –	0	7	6
Fourth, croſs ploughing, –	0	9	0
Ox-harrowing twice, –	0	2	0
Fifth ploughing, – –	0	7	6
Landing up the ſixth, –	0	3	9
2 Buſhels ſeed, – –	0	12	0
Sowing, – –	0	3	0
Sixth earth ploughing, –	0	3	9
Water-furrowing, –	0	1	0
Reaping, – –	0	10	0
Harveſting, – –	0	3	6
Carry over, –	4	[illegible]	[illegible]

Brought over,	£. 4	6	7
Thraſhing, at 3 *s.* 4 *d.*	0	12	4
Carrying out,	0	2	0
Rent,	2	4	0
	7	4	11

Produce.

4 Quarters, at 5 *s.* 6 *d.*	10	10	0
Straw, 2 loads, at 21 *s.*	2	2	0
	12	12	0
Expences,	7	4	11
Profit,	5	7	1

Recapitulation.

1768.	Winter tares: profit,	4	10	6
1769.	Fallow,			
1770.	Wheat ditto,	5	7	1
		9	17	7
1767.	Peaſe: loſs,	0	1	7
	Profit,	9	16	0
	Or *per ann.*	2	9	0

Obſervations.

This courſe is by no means an advantageous one. The pea crop not adviſable by any means. Had oats been harrowed in, probably the balance would have been a conſiderable profit inſtead of loſs; and the fallow year, in all probability, might have yielded a profitable crop of beans, ſucceeded by wheat; but this is uncertain. However, the profit of 2*l.* 9*s.* an acre clear, is by no means to be deſpiſed. It much exceeds what the farmers in general make.

Experiment, No. 63.

Courſe—1. Fallow 3. Wheat
2. Spring tares 4. Oats.

Three acres: ſoil, a ſtrong loam on clay, but not deep.

1767

Fallowed for ſpring tares; the crop mown and given to ſheep in a pen. The three acres kept 80 ewes a month, at 2*d.* a week. During which time they made 20 loads of dung from 2 loads of ſtraw.

Expences.

Two ploughings, –	£. 0	9	0
Third ditto, – –	0	9	0
Part of it 12 inches deep			
Landing it up into 3 bout lands,	0	7	6
Water-furrowing, – –	0	1	0
Gathering 2 into one in *May*,	0	7	6
Carry over,	1	14	0

Brought over, –	£. 1	14	0
Sowing, – –	0	0	3
2 Buſhels of tares, – –	0	9	0
Harrowing, – – –	0	1	6
Striking furrows, – –	0	0	9
Mowing and giving the ſheep, &c.	0	5	0
Rent, &c. – – –	2	4	0
	4	14	6

Produce.

Keeping 80 Sheep 4 weeks, at 2 *d.* a ſheep, 2 *l.* 13 *s.* 4 *d.* the third of which is, –	0	17	9
Loſs, – –	3	16	9

1769.

After the tares wheat was ſown; the product 2 quarters *per* acre.

Expences.

Ploughing, – – –	£. 0	7	6
Harrowing, – – –	0	1	6
Seed, 2 buſhels – –	0	11	0
Sowing, – – –	0	0	3
15 Sacks *per* acre of rabbit dung, and ſowing, –	0	19	0
Carriage ditto, – –	0	2	6
Striking furrows, –	0	0	9
Carry over, –	2	2	6

Brought over, - -	£ 2	2	6
Water-furrowing, -	0	1	0
Weeding, - -	0	6	0
Reaping, - -	0	8	0
Harveſting, - -	0	3	6
Thraſhing, - -	0	6	0
Carrying out, - -	0	1	0
Rent, &c. - -	1	2	0
	4	10	0

Produce.

2 Quarters, at 44*s*. -	4	8	0
Straw, 1 ½ load, -	1	10	0
	5	18	0
Expences, -	4	10	0
Profit, - - -	1	8	0

1770.

Ploughing, - -	0	5	0
Harrowing, - -	0	1	6
3 Buſhels oats, -	0	8	6
Sowing, - -	0	0	3
Striking furrows with double mould-board plough, -	0	1	2
Water-furrowing, -	0	1	0
Mowing, - -	0	1	8
Carry over, -	0	19	1

Brought over,	£. 0	19	1
Harveſting,	0	4	6
Thraſhing,	0	4	6
Rent,	1	2	0
Total,	2	10	1

Produce.

3 Quarters of oats,	3	0	0
Straw 1 ½ load,	1	10	0
Total,	4	10	0
Expences,	2	10	1
Profit,	1	19	11

Recapitulation.

1768. Tares, loſs,				3	16	9
1769. Wheat, profit,	£. 1	8	0			
1770. Oats ditto,	1	19	11			
				3	7	11
Loſs,				0	8	10
Or *per annum*,				0	2	2

Obſervations.

This courſe is as diſadvantageous, as can well be imagined. To give a complete fallow for a crop of ſpring tares, is what no perſon would willingly do, unleſs he foreſees a great want of food for his ſtock: this occaſioned the firſt loſs, and a poor crop of wheat ſucceeding, rendered the whole uncommonly diſadvantageous. The principal profit here, is reaped from ſowing oats after wheat; bad huſbandry in general, but clover was ſown with this wheat, which miſcarried, and that was the reaſon of ſowing the oats.

Experiment, No. 64.

Courſe.

1. Barley	3. Clover
2. Clover	4. Wheat.

Three acres; the ſoil a ſtrong loam on clay.

1767.

Sown with barley; the produce 2 quarters and a half *per* acre.

Expences.

	£.	s.	d.
Firſt ploughing, 12 inches deep in winter, 1766, -	£. 0	12	0
Slitting down in *April*, -	0	7	6
Two buſhels barley, -	0	6	0
Sowing, - -	0	0	3
Harrowing, -	0	1	6
Striking furrows, - -	0	0	9
Water-furrowing, -	0	1	0
Carry over,	1	9	0

Brought over, -	£. 1	9	0
Mowing, - -	0	1	6
Harveſting, -	0	4	6
Thraſhing, -	0	4	6
Carrying out, -	0	2	6
Rent, - -	1	2	0
Total, -	3	4	0

Produce.

2 ½ quarters, at 30*s.* -	3	15	0
Straw one load, -	1	0	0
Total, -	4	15	0
Expences, - -	3	4	0
Profit, - -	1	11	0

1768.

Clover was ſown with the barley; it was mown twice for hay, and yielded 3 ½ loads: the firſt mowing the 10th of *June*, to cut off the black bent, that it might not ſhed: the ſecond was the beginning of *Auguſt*.

Expences.

10 *lb.* Seed clover, -	0	3	4
Sowing, - -	0	0	3
Manuring in *January* 12 loads an acre yard dung and coal aſhes, at 7*s.* -	4	4	0
Carry over, -	4	7	7

Brought over,	£. 4	7	7
Spreading,	0	1	6
Mowing twice,	0	4	9
Making twice,	0	12	0
Carting and ſtacking ditto,	0	10	0
Rent,	1	2	0
Total,	6	17	10

Produce.

3 ½ Loads, at 3 *l.*	10	10	0
Sheep feed,	0	5	0
Total,	10	15	0
Expences,	6	17	10
Profit,	3	17	2

1769.

Mown once; produce 1 ½ load.

Expences.

Mowing,	0	2	6
Making,	0	6	0
Carting and ſtacking,	0	5	0
Rent,	1	2	0
Total,	1	15	6

Produce.

1 ½ Load hay, at 3 *l.*	£.4	10	0
After-graſs,	0	15	0
Total,	5	5	0
Fxpences,	1	15	6
Profit,	3	9	6

1770.

Wheat harrowed in on one trench-ploughing; produce 3 ½ quarters *per* acre.

Expences.

Trench-ploughing with *Ducket*'s plough in *September*,	0	13	0
Seven pecks ſeed,	0	9	0
Sowing,	0	0	3
Harrowing,	0	3	0
Water-furrowing,	0	1	0
Striking furrows,	0	0	6
Weeding,	0	7	0
Reaping,	0	10	0
Harveſting,	0	4	0
Thraſhing,	0	10	6
Carrying out,	0	1	9
Rent,	1	2	0
Total,	4	2	0

Produce.

3 ½ quarters, at 50*s.* –	£. 8	15	0
Straw, 2 loads, at 24*s.*	2	8	0
Total, –	11	3	0
Expences, – –	4	2	0
Profit,	7	1	0

Recapitulation.

1767. Barley, profit, –	1	11	0
1768. Clover, ditto, –	3	17	2
1769. Ditto, – –	3	9	6
1770. Wheat, ditto, –	7	1	0
Total, – –	15	18	8
Or *per ann.* –	3	19	8

Obſervations.

This courſe is perfectly conſiſtent with the beſt ideas of modern huſbandry, and we accordingly find it very profitable: there cannot well be a ſtronger argument for adopting a beneficial courſe of crops, than the reſult of this. Near 4*l.* *per* acre clear profit *per ann.* ſhews what the ſoil is capable of when properly managed. The material point, which calls for a particular remark, is the leaving the clover two years on the land. It is here evidently moſt excellent huſbandry, notwithſtanding the black bent appeared in it ſo early. A clear profit of 3 *l.* 9 *s.* *per* acre, on the ſecond crop is an object of no trifling magnitude; and the great produce of wheat following ſhews plainly, that that crop did not ſuffer the leaſt from the clover lying two years inſtead of one.

Another point, which I ſhall beg leave to obſerve, is the ſucceſs which here attends trench-ploughing the clover-lay for wheat. This is an uncommon practice; but it is evidently an excellent one: it is what the farmers are fearful of, tho' plainly without reaſon.

Experiment, No. 65.

Courſe.

1. Tares and flax
2. Fallow
3. Tares
4. Wheat.

Six acres; the ſoil a good mellow loam on brick earth.

1767.

In 1766, it yielded wheat, and one half ploughed afterwards for tares: they were cut for horſes, and kept eight a month. Flax was ſown on the other half, which was pulled in *Auguſt*, and came to 4 *l.* *per* acre.

Account of the tares.

Expences.

Ploughed 12 inches deep,	£. 0	12	0
In *April* a ſecond earth,	0	7	6
2 Buſhels tares,	0	9	0
Sowing,	0	0	3
Harrowing,	0	1	6
Mowing and carting,	0	5	0
Rent,	1	2	0
Total,	2	17	3

Produce.

Keeping 8 horſes a month, at 7*s.* 11 *l.* 4 *s.* the 3d of which is	3	14	8
Expences,	2	17	3
Profit,	0	17	5

Account of the flax.

Expences.

Ploughing,	0	12	0
2 Buſhels flax ſeed,	0	9	0
Sowing,	0	0	3
Harrowing,	0	2	0
Pulling,	0	8	0
Binding and bringing home,	0	5	0
Watering,	0	3	0
Carry over,	1	19	3

Brought over, –	£. 1	19	3
Sodding and unſodding,	0	3	0
Spreading on graſs, –	0	5	0
Turning, – –	0	2	6
Gathering, binding and carting,	0	8	0
Rent, – –	1	2	0
Total, –	3	19	9

Produce.

Yielded *per* acre, –	4	0	0
Expences, – –	3	19	1
Profit, – –	0	0	11

1768

Ploughing 12 inches deep in autumn, –	0	12	0
Water-furrowing, –	0	1	0
Hunting down in *May*, –	0	7	6
In *June* croſs ploughing, –	0	7	6
Fourth earth in *July*, ſtirring,	0	5	0
Ox-harrowed in *Auguſt*,	0	3	0
Deſigned for wheat; but ſuch a deluge of rain in *September*, that could not go on; but furrows were drawn in the low places, – –	0	0	6
Water-furrowing, –	0	1	0
Carry over, -	1	17	6

Brought over, -	£. 1	17	6
In *May* trench-ploughed,	0	13	0
2 Buſhels tares, -	0	9	0
Harrowing, - -	0	1	0
Rent, - -	1	2	0
Total, - -	4	2	6

Produce.

Sheep fed.-worth *per* acre,	0	5	0
Loſs, - -	3	17	0

1770.

Trench-ploughed it in *Auguſt*,	0	13	0
Ox-harrowing, - -	0	3	0
Landing up in *September*,	0	5	0
Harrowing, -	0	1	0
2 Buſhels wheat, - -	0	10	6
Sowing, - -	0	0	3
Ploughing in, - -	0	5	0
Water-furrowing, -	0	1	0
15 Sacks rabbits dung, -	1	0	0
Sowing, - -	0	1	6
Weeding, - -	0	6	0
Reaping, - -	0	8	0
Harveſting, - -	0	3	6
Carrying, - -	0	1	3
Thraſhing, - -	0	7	6
Rent, - -	1	2	0
Total, -	5	8	6

Produce.

	£	s	d
2½ quarters, at 48 *s.* –	£. 6	0	0
Straw, 1½ load, at 25 *s.*	1	17	6
Total, – –	7	17	6
Expences, – –	5	8	6
Profit, – –	2	9	0

Recapitulation.

1768,9. Tares, loſs, –				3	17	0
1767. Tares, profit,	£. 0	17	5			
1770. Wheat, ditto,	2	9	0			
				3	6	5
Loſs, – –				0	10	7
Or *per ann.* – –				0	2	7
1768,9. Tares, loſs, –				3	17	0
1767. Flax, profit,	0	0	11			
1770. Wheat, ditto,	2	9	0			
				2	9	11
Loſs, –				1	7	1
Or *per ann.* –				0	6	9

Obſervations.

An unfortunate ſeaſon in preventing the wheat ſowing, rendered this courſe almoſt as bad a one as could have happened. Tares here paid nothing for an extraordinary expence beſtowed on them. Had beans been ſown inſtead of the ſecond crop of tares, the account would have been very different.

Flax anſwers very badly in this trial; the crop is not large, but the expences run very high. It is here however to be obſerved, that this field is exceſſive poor, and had not received a load of dung of 20 years.

Experiment, No. 66.

Courſe.

1. Oats
2. Peaſe
3. Fallow
4. Wheat.

Three acres; the ſoil the ſame as No. 65.

1767.

In 1766 it yielded clover, ploughed up, and harrowed in oats; the crop 4 ½ quarters an acre.

Expences.

	£.	s.	d.
Ploughing, - -	£. 0	9	0
3 Buſhels oats, -	0	6	9
Harrowing, - -	0	1	6
Water-furrowing, - -	0	1	0
Mowing, - -	0	1	8
Harveſting, - -	0	4	6
Carry over,	1	4	5

Brought over,	£. 1	4	5
Thraſhing,	0	6	9
Rent,	1	2	0
Total,	2	13	2
Produce.			
4 ½ Quarters, at 17*s.*	3	16	6
Straw 1 ½ load, at 16*s*	1	4	0
Total,	5	0	6
Expences,	2	13	2
Profit,	2	7	4
1768.			
Ploughed up the oat ſtubble in *January*,	0	7	6
2 Buſhels 1 peck peaſe, at 5*s.* 6*d.*	0	12	3
Sowing,	0	0	3
Harrowing in in *February*,	0	1	6
Alſo 10 ſacks kiln duſt,	1	0	0
Carriage of ditto,	0	2	6
Sowing,	0	1	6
Striking furrows,	0	0	9
Topping thiſtles,	0	0	4
Cutting,	0	1	8
Harveſting,	0	3	0
Thraſhing,	0	3	0
Carry over,	2	14	3

Brought over, -				£.2	14	3
Carrying out, -				0	0	9
Rent, - -				1	2	0
Total, -				3	17	6

Produce.

12 Buſhels, at 36*ſ*.	£.2	14	0			
Straw, 3 quarters load,	0	15	0			
				3	9	0
Loſs, - -				0	8	6

1769.

Ploughed in autumn, -	0	7	6
Water-furrowed, -	0	1	0
In the ſpring the black bent came thick; it was fed by ſheep till the middle of *May*, then hunted down, - -	0	5	0
Croſs ploughing, -	0	7	6
Stirring, - -	0	5	0
Ox-harrowing, -	0	3	0
Landing up in *Auguſt*, -	0	5	0
2 Buſhels wheat, -	0	11	0
Sowing in *October*, -	0	0	3
Harrowing, - - -	0	0	6
Water-furrowing, -	0	1	0
In *February* 15 ſacks of rabbit dung, - -	1	0	0
Carry over, -	3	6	9

	£.	s.	d.
Brought over,	3	6	9
Sowing,	0	1	6
Reaping,	0	8	0
Harveſting,	0	4	0
Thraſhing,	0	10	6
Carrying out,	0	1	9
Rent,	2	4	0
Total,	6	16	6

Produce.

3 ½ quarters, at 48 *s.*	8	8	0
Straw 2 loads, at 25 *s.*	2	10	0
Total,	10	18	0
Expences,	6	16	6
Profit,	4	1	6

Recapitulation.

1767. Oats, profit,	2	7	4
1770. Wheat ditto,	4	1	6
Total,	6	8	10
1768. Peaſe, loſs,	0	8	6
Profit,	6	0	4
Or *per ann.*	1	10	1

Obſervations.

A pea crop to prove unprofitable is not uncommon; but to be neceſſitated to ſucceed it with a fallow, was a circumſtance that could not fail of making this courſe indifferent; yet the profit amounts to 1 *l.* 10 *s.* *per* acre *per ann.* which is vaſtly more than one would at firſt ſight imagine: indeed it is ſo much, that it is difficult to allow the courſe to be ſo bad as it appears. Probably it would have proved more advantageous, had not the whole field been peſtered with the running ſow-thiſtle, an extreme bad weed.

Experiment, No. 67.

Courſe.

1. Beans. 2. Wheat. 3. Tares.

One acre and three roods; the ſoil a ſtrong yellow loam on brick earth. In 1766 it was a very bad old weedy lay.

1767.

Dibbled with beans: the product five and a half quarters an acre.

Expences.

Ploughing in *January*,	—	£. 0	11	0
Harrowing,	—	0	1	0
Dibbling,	—	0	5	6
2 ½ Buſhels tick beans,	—	0	8	9
Harrowing,	—	0	1	0
Striking furrows,	—	0	0	9
Twice hand-hoeing,	—	1	0	0
Carry over,	—	2	8	0

Brought over,	£. 2	8	0
Topping,	0	0	6
Reaping,	0	8	0
Harveſting,	0	3	6
Thraſhing,	0	6	5
Rent, &c.	1	2	0
Total,	4	8	5

Produce.

5 ½ quarters, at 25*s.*	6	17	6
Straw 2 loads, at 25*s.*	2	10	0
Total,	9	7	6
Expences,	4	8	5
Profit,	4	19	1

1768.

Ploughed the ſtubble once, and harrowed in wheat: the crop 4 quarters an acre.

Expences.

Ploughing,	0	9	0
Harrowing,	0	1	6
Two buſhels ſeed,	0	12	0
Sowing,	0	0	3
Water-furrowing,	0	1	0
Reaping,	0	9	0
Harveſting,	0	3	6
Thraſhing,	0	12	0
Carrying,	0	2	0
Rent,	1	2	0
Total,	3	12	3

Produce.

4 Quarters, at 52s. 6*d.*	£.	10	10	0
Straw 2 loads, at 25*s.* –		2	10	0
Total, – –		13	0	0
Expences, –		3	12	3
Profit, – –		9	7	9

1769.

Ploughed the wheat ſtubble once, and harrowed in winter tares; cut green for ſoiling horſes; they kept eight four weeks.

Expences.

Ploughing, – –	0	9	0
Two buſhels tares, –	0	10	0
Sowing, – –	0	0	3
Harrowing, – –	0	1	6
Striking furrows with double mould-board plough, –	0	1	2
Water-furrowing, –	0	1	0
Mowing and carrying.	0	5	0
Rent, – –	1	2	0
Total, – –	2	9	11

Produce.

The acre and ¾ kept 8 horſes 4 weeks, at 7*s.* which is *per* acre, – –	6	8	0
Expences, –	2	9	11
Profit, – –	3	18	1

1770.

Ploughed up the tare ſtubble in *September*, and harrowed in rye; the beginning of *March*, and in part of *April*, eat off the rye with ſheep. It kept 20 couple five weeks; it was then ploughed four times, and planted in *Auguſt* with cabbages, in equally-diſtant rows, 2 ½ feet aſunder.

Expences.

Ploughing,	£. 0	7	6
Two buſhels rye,	0	7	0
Sowing,	0	0	3
Harrowing,	0	1	6
Striking furrows with double mould-board plough,	0	1	2
Water-furrowing,	0	1	0
Ploughing ten inches deep,	0	10	0
Croſs ditto,	0	9	0
Stirring,	0	7	6
Rolling with ſpiky roller,	0	2	0
Manuring with night ſoil, 7 loads *per* acre,	3	17	0
Spreading,	0	1	3
Ox-harrowing,	0	1	0
Ploughing,	0	7	6
Spiky roller,	0	2	0
Harrowing,	0	1	0
Planting,	0	10	0
Horſe-hoeing, ſhim twice,	0	1	4
Hand-hoeing once,	0	4	0
Rent,	1	2	0
Total,	8	14	0

Recapitulation.

1767. Beans, profit,	£. 4	19	1
1768. Wheat ditto, -	9	7	9
1769. Tares ditto, -	3	18	1
Total, -	18	4	11
Average, - -	6	1	7

Experiment, No 68.

Courſe.

1. Drilled beans
2. Drilled wheat
3. Drilled beans
4. Winter tares.

Five acres; the ſoil good; a ſtrong loam on clay.

1767.

This crop of drilled beans is minuted in *Experiment*, No. 38.

Product, 3 quarters, at 25*s.*	3	15	0
Straw, - -	1	0	0
Total, - -	4	15	0
Expences, - -	3	16	6
Profit, -	0	18	6

1768.

This drilled wheat is that of *Experiment*, No. 36.

Product, 3 quarters, 52*s.* 6*d.*	7	17	6
Straw, - -	1	5	0
1	9	2	6

Product,	£. 9	2	6
Expences,	5	8	11
Profit,	3	13	7

1769.

Theſe drilled beans regiſtered in *Experiment*, No. 40.

Produce, 3 quarters,	3	15	0
Straw,	1	5	0
Total,	5	0	0
Expences,	3	6	11
Profit,	1	13	1

1770.

In *October* the bean ſtubble was ploughed up with 2 horſes, 8 or 9 inches deep, and 2 buſhels *per* acre of winter tares harrowed in: the crop mown for ſoiling horſes, and kept 12 two months.

Expences.

Ploughing,	0	5	0
Seed,	0	10	0
Sowing,	0	0	3
Harrowing,	0	1	6
Striking furrows,	1	2	0
Water-furrowing,	0	0	3
Mowing and carrying,	0	5	0
Rent, &c.	1	2	0
Total,	2	5	2

Produce.

Keeping 12 horſes 8 weeks, at *7s. 6d.*—*36l.*; the fifth is	£. 7	4	0
Expences, - -	2	5	2
Profit, - -	4	18	10

Recapitulation.

1767. Drilled beans, profit,	0	18	6
1768. Ditto wheat, ditto, -	3	13	7
1769. Ditto beans, ditto,	1	13	1
1770. Winter tares, ditto,	4	18	10
Total, - -	11	4	0
Which is *per ann.* -	2	16	0

Obſervations.

Both the drill huſbandry, and that of winter tares, figure very advantageouſly in this courſe, which is upon the whole unexceptionable: the vaſt produce of a good crop of winter tares renders them remarkably profitable.

Experiment, No. 69.

Courſe.

1. Oats, ſtubble left
2. Fallow
3. Drilled wheat
4. Drilled beans.

Three acres; the ſoil a ſtrong loam on clay.

1768.

In autumn, 1767, the old ſtubble was ploughed up, 12 inches deep, and tilled through this year, and in autumn following.

1769.

Drilled with wheat, double rows on three-feet lands, three pecks of ſeed *per* acre. In the ſpring it was manured with twenty ſacks *per* acre of rabbits dung; it was hand-hoed once, weeded once, and horſe-hoed twice, once with ſhim, and once with the double mould-board plough: the crop two quarters *per* acre.

Expences.

Ploughing,	£. 0	12	0
Hunting,	0	7	6
Croſs ditto,	0	7	6
Stirring,	0	7	6
Ox-harrowing,	0	4	6
Landing up with double mould-board plough,	0	2	1
Drilling,	0	1	6
Seed,	0	2	6
Striking,	0	1	2
Water-furrowing,	0	1	0
Rabbit dung,	1	8	6
Hand-hoeing,	0	6	0
Shim,	0	0	8
Double mould-board plough,	0	1	2
Carry over,	4	3	7

Brought over,				£. 4	3	7
Weeding,				0	6	0
Reaping,				0	8	0
Harveſting,				0	3	6
Thraſhing,				0	6	0
Three years rent, &c.				3	6	0
Total,				8	13	1
Produce.						
2 Quarters, at 44*s.*	4	8	0			
Straw,	1	0	0			
				5	8	0
Loſs,				3	5	1

From this crop it is extremely evident, that the mere reſting land is of no benefit without tillage; the crop could ſcarcely fail being unprofitable with ſuch an accumulation of expences. It ſhould however be remarked, that this field, when firſt Mr. *Arbuthnot* had it, was remarkably foul and poor.

1770.

Theſe beans are minuted in *Experiment*, No. 43.

The profit *per* acre 4*l.* 11*s.* 8*d.*

Recapitulation.

1770. Drilled beans, profit,	4	11	8
1769. Wheat, loſs,	3	5	1
Profit,	1	6	7
Or *per ann.*	0	6	7

This field is now drilled with wheat.

Experiment, No. 70.

Courſe.

1. Fallow
2. Drilled beans
3. Wheat
4. Drilled beans.

Three acres; the ſoil a ſtrong clay; taken in miſerable order, quite foul and poor.

1767.

In 1766, yielded oats, the ſtubble of which was ploughed up in *May*, 1767, and hemp ſown; but the crop miſcarried: it was then landed up for the winter.

1768.

In the ſpring, drilled with horſe-beans, kept clean by hand and horſe-hoeing; the crop 3 quarters *per* acre.

Expences.

Firſt ploughing, -	£. 0	9	0
Harrowing, - -	0	1	6
Croſs ploughing, -	0	7	6
Landing up, - -	0	7	6
Water-furrowing, -	0	1	0
Drilling, - -	0	1	6
Harrowing, - -	0	0	6
1 Buſhel and a half ſeed, -	0	5	3
Water-furrowing, - -	0	1	0
Hand-hoeing, - -	0	5	0
Shim, - -	0	0	8
Double mould-board plough,	0	1	2
Carry over,	2	1	7

Brought over,	£.2	1	7
Ditto both again,	0	1	10
Pulling,	0	7	0
Harveſting,	0	3	0
Thraſhing,	0	4	6
Rent,	2	4	0
Total,	5	1	11

Produce.

3 Quarters, at 30*s.*	4	10	0
1 Load ſtraw,	1	0	0
Total,	5	10	0
Expences,	5	1	11
Profit,	0	8	1

1769.

Ploughed up the bean ſtubble in autumn; ploughed it again in *November*; in *January* landed up, and in *March* ſowed with wheat, and with it 20 ſacks an acre of rabbit dung. It was weeded; the crop 2 quarters and a half *per* acre.

Expences.

Firſt ploughing,	0	7	6
Second ditto,	0	7	6
Water-furrowing,	0	1	0
Two buſhels ſeed,	0	13	0
Sowing,	0	0	3
Carry over,	1	9	3

Brought over, -	£. 1	9	3
Rabbit dung, &c. -	1	8	2
Weeding, - -	0	6	0
Reaping, -	0	8	0
Harveſting, - -	0	3	6
Thraſhing, - -	0	3	9
Rent, &c. - -	1	2	0
Total, - -	5	0	8

Produce.

Two quarters and a half, at 44*s.*	5	10	0
Straw 1 load and a half, at 25*s.*	1	17	6
Total, - -	7	7	6
Expences, -	5	0	8
Profit, - -	2	6	10

1770.

This crop of drilled beans is that of *Experiment*, No. 42.

Profit *per* acre 6*l.* 0*s.* 5*d.*

Recapitulation.

1767. Fallow.			
1768. Drilled beans, profit,	0	8	1
1769. Wheat ditto, -	2	6	10
1770. Drilled beans ditto,	6	0	5
Total, - -	8	15	4
Or *per ann.* - -	2	3	10

Experiment, No. 71.

Courſe.

1. Drilled peaſe	3. Beans
2. Wheat	4. Wheat.

Five acres; the ſoil a ſandy loam.

1767.

This is the crop regiſtered in *Experiment*, No. 45. Profit 6 *s.* 8 *d.*

1768.

This drilled wheat is minuted under *Experiment*, No. 35. The profit 2 *l.* 8 *s.* 7 *d.* *per* acre.

1769.

Drilled beans. See *Experiment*, No. 41. Profit 2 *l.* 5 *s.* 7 *d.*

1770.

The bean ſtubble ploughed directly after harveſt, and after harrowing, and hunting, ſown broad-caſt with wheat. In *February* manured with rabbit dung. Product 2 quarters *per* acre.

Expences.

Firſt ploughing,	£. 0	10	0
Harrowing,	0	1	0
Second ploughing,	0	7	6
Harrowing,	0	1	0
Two buſhels ſeed,	0	12	6
Sowing,	0	0	3
Carry over,	1	12	3

	£.	s.	d.
Brought over,	1	12	3
Ploughing in gathering up,	0	5	0
Water-furrowing,	0	1	0
15 Sacks rabbit dung,	1	1	6
Weeding,	0	5	0
Reaping,	0	8	0
Harveſting,	0	3	6
Thraſhing,	0	6	0
Rent,	1	2	0
Total,	5	4	3

Produce.

2 Quarters, at 48*s.*	4	16	0
1 Load ſtraw,	1	5	0
Total,	6	1	0
Expences,	5	4	3
Profit,	0	16	9

Recapitulation.

1767. Drilled peaſe, profit,	0	6	8
1768. Ditto wheat, ditto,	2	8	7
1769. Ditto beans, ditto,	2	5	7
1770. Wheat ditto,	0	16	9
Total,	5	17	7
Or *per ann.*	1	9	4

This field was alſo extremely foul and poor: it is now winter tares, ſucceeded by a baſtard fallow.

Experiment, No. 72.

Courſe.

1. Drilled beans
2. Ditto wheat
3. Ditto beans
4. Ditto wheat.

Eight acres regiſtered in the *Experiments* 28, &c.

Average profit *per annum* of the four years, 3 *l.* 15 *s.* 2 *d.*

Experiment, No. 73.

Courſe.

1. Fallow
2. Drilled beans
3. Ditto wheat
4. Ditto beans.

See *Experiments*, No. 32, 33, and 34.

Average profit of the 4 years, 1 *l.* 1 *s.* 11 *d.*

Experiment, No. 73.*

Courſe.

1. Oats
2. Tares
3. Fallow
4. Drilled wheat

Seven acres and 3 quarters; the ſoil a ſtrong loam on brick earth.

1767.

Yielded clover in 1766, ploughed it in ſpring, and harrowed in oats; the crop 4 quarters *per* acre.

Expences.

		£.	s.	d.
Ploughing,	- -	0	10	0
3 Buſhels oats,	-	0	6	9
Sowing,	- -	0	0	3
Carry over,	-	0	17	0

Brought over,	£. 0	17	0
Harrowing,	0	2	0
Water-furrowing,	0	1	0
Mowing,	0	2	0
Harveſting,	0	5	0
Thraſhing,	0	6	0
Rent,	1	2	0
Total,	2	15	0

Produce.

4 Quarters, at 16s.	3	4	0
2 Load ſtraw,	1	12	0
Total,	4	16	0
Expences,	2	15	0
Profit,	2	1	0

1768.

Ploughed up in *January*, and harrowed in tares; but they nearly failed; the value not more than 8s. an acre.

Ploughing,	0	9	0
2 Buſhels ſeed,	0	8	0
Harrowing,	0	2	0
Sowing,	0	0	3
Water-furrowing,	0	1	0
Rent,	1	2	0
Total,	2	2	3

Produce.

Value of food,	0	8	0
Loſs,	1	14	3

1770.

For this wheat, ſee *Experiment*, No. 37. Profit 4*l.* 17*s.*

Recapitulation.

1767. Oats, profit,	£. 2	1	0
1770. Wheat ditto,	4	17	0
Total,	6	18	0
1768. Tares, loſs	1	14	3
Profit,	5	3	9
Or *per annum*,	1	5	11

Experiment, No. 74.

Courſe.

1. Oats. 2. Drilled Peaſe. 3. Barley.

1769.

Four acres and a half; the ſoil a light loam on brick earth; the crop of oats five quarters and a half.

Expences.

Ploughing,	0	10	0
Three buſhels ſeed,	0	6	9
Harrowing,	0	2	0
Sowing,	0	0	3
Water-furrowing,	0	1	0
Mowing,	0	2	0
Harveſting,	0	5	0
Thraſhing,	0	8	3
Rent,	1	2	0
Total,	2	17	3

Produce.

5 Quarters and a half, at 17*s.*		£. 4	13	6
Straw 2 loads,	– –	1	12	0
Total,	– –	6	5	6
Expences,	–	2	17	3
Profit,	–	3	8	3

1768.

For this crop of drilled peaſe, ſee *Experiment*, No. 47. Loſs 6*l.* 8*s.* 6*d.*

1769.

In *April* ploughed it with double coulters, croſs ploughed it and broke the clods, which were very rough, with the ſpiky roller; after the roller ox-harrowed it with ſix horſes. Without the uſe of this roller, a barley ſeaſon could never have been made. It was ſown with three buſhels an acre: after ſowing and harrowing clods remaining, it was again rolled with little ſpiky roller: the product 4 quarters *per* acre.

Expences.

Ploughing,	- - –	0	7	6
Croſs ditto,	– –	0	7	6
Spiky rolling,	– –	0	2	0
Ox-harrowing,	–	0	3	0
Carry over,	–	1	0	0

Brought over,	£. 1	0	0
Three buſhels ſeed,	0	9	0
Sowing,	0	0	3
Harrowing,	0	1	6
Striking furrows,	0	1	2
Spiky rolling,	0	0	6
Mowing,	0	2	0
Harveſting,	0	4	0
Thraſhing,	0	6	0
Carrying,	0	1	0
Rent,	1	2	0
Total,	3	7	5

Produce.

4 Quarters, at 20*s.*	£. 4	0	0
Straw 2 loads,	1	12	0
Total,	5	12	0
Expences,	3	7	5
Profit,	2	4	7

Recapitulation.

1768. Drilled peaſe, loſs,				6	8	6
1767. Oats, profit,	£. 3	8	3			
1769. Barley, profit,	2	4	7			
				5	12	10
Loſs,				0	15	8
Average,				0	5	2

Experiment, No. 75.

Courſe.

1. Fallow
2. Madder
3. Madder
4. Madder.

Seven acres; the ſoil a ſandy loam.

Regiſtered in *Experiment*, No. 8. Profit in the four years 165*l.* 0*s.* 6*d.* or *per* acre 23*l.* 11*s.* 6*d.* *Per* acre *per ann.* 7*l.* 17*s.* 2*d.*

Experiment, No. 76.

Courſe.

1. Fallow
2. Madder
3. Madder
4. Madder.

Nine acres; regiſtered in *Experiment*, No. 9. Profit on the nine 245*l.* 1*s.* which is *per* acre 27*l.* 9*s.* and *per* acre *per ann.* 9*l.* 3*s.*

Experiment, No. 77.

Courſe.

1. Drilled barley
2. Ditto beans
3. Potatoes.

Two acres; the ſoil a ſtrong loam.

1767.

For drilled barley, ſee *Experiment*, No. 59. Loſs 16*s.*

1768.

Drilled with tick beans, double rows, on three-feet lands; product 2 quarters 1 buſhel *per* acre.

Expences.

Ploughing in autumn, -	£. 0	9	0
Water-furrowing, -	0	1	0
Drilling in *March*, -	0	1	6
Two buſhels ſeed, - -	0	6	0
Striking with double mould-board plough, - -	0	1	2
Water-furrowing, -	0	1	0
Two hand-hoeings, - -	0	10	0
Shim once, -	0	0	8
Double mould-board plough ditto,	0	1	2
Pulling, -	0	7	0
Harveſting, - -	0	4	0
Thraſhing, - -	0	2	7
Rent, - -	1	2	0
Total, -	3	7	1

Produce.

2 Quarters 2 buſhels, at 25*s.*	2	13	1
Straw half a load, -	0	10	0
Total, - -	3	3	1
Loſs, - -	0	4	0

1769.

For the potatoes, ſee *Experiment*, No. 61. Profit 8 *l.* 6 *s.* 6 *d.*

Recapitulation.

				£.	s.	d.
1769. Potatoes, profit,				£. 8	6	6
1767. Ditto barley, loſs,	0	16	0			
1768. Beans, ditto,	0	4	0			
				1	0	0
Profit, - -				7	6	6
Per annum, -				2	8	10

Experiment, No. 78.

Courſe.

1. Drilled barley 3. Turnips.
2. Broad-caſt beans

Soil the ſame as No. 77.

1767

The drilled barley the ſame.

1768.

Sown with tick beans; the crop 2 quarters *per* acre.

Expences.

Ploughing, - -	0	9	0
Water-furrowing, - -	0	1	0
Sowing, - -	0	0	3
Three buſhels ſeed, -	0	0	0
Harrowing, -	0	2	0
Striking furrows, - -	0	1	2
Water-furrowing, -	0	1	0
Two hand-hoeings,	0	10	0
Carry over, -	1	13	5

Brought over,	£. 1	13	5
Pulling,	0	7	0
Harveſting,	0	4	0
Thraſhing,	0	2	4
Rent,	1	2	0
Total,	3	8	9

Produce.

Two quarters, at 25 *s.*	2	10	0
Straw three quarters of a load,	0	15	0
Total,	3	5	0
Loſs,	0	3	9

1769.

Well tilled and manured for turnips; the crop 3 *l.* 3 *s.* *per* acre.

Expences.

Ploughing,	0	9	0
Water-furrowing,	0	1	0
Hunted in *May*,	0	7	6
Ox-harrowing,	0	3	0
17 Loads yard-dung,	5	2	0
Spreading,	0	2	0
Twice ploughing,	0	10	0
Harrowing,	0	1	0
Drilling with the cag-plough,	0	0	9
Seed,	0	0	3
Hand-hoeing,	0	10	0
Rent,	1	2	0
Total,	8	8	6

Expences, -	£. 8	8	6

Produce.

Food, - -	3	3	0
Loſs, - -	5	5	6

Recapitulation.

1767. Drilled barley, loſs,	0	16	0
1768. Beans ditto, -	0	3	9
1769. Turnips ditto, -	5	5	6
Loſs, - -	6	5	3
Per ann. - -	2	1	9

Experiment, No. 79.

Courſe.

1. Oats. 2. Beans. 3. Tares.

One acre and three quarters; the ſoil a ſtrong clay. In 1766 it yielded wheat.

1767.

The ſtubble of which was ploughed up in *March*, and oats harrowed in; the crop three quarters *per* acre.

Expences.

Ploughing, -	0	10	0
Harrowing, - -	0	2	0
Seed three buſhels, -	0	6	9
Sowing, - - -	0	0	3
Water-furrowing, -	0	1	0
Mowing, -	0	1	8
Carry over,	1	1	8

Brought over, -	£. 1	1	8
Harveſting, -	0	4	0
Thraſhing, - -	0	4	6
Rent, &c. - -	1	2	0
Total, - -	2	12	2

Produce.

Three quarters, at 15 *s.* -	2	5	0
One load and quarter ſtraw,	1	0	0
Total, - -	3	5	0
Expences, -	2	12	2
Profit, - -	0	12	10

1768.

Ploughed up the oat ſtubble in *January*, and harrowed in tick beans; the crop two quarters *per* acre.

Expences.

Ploughing, - -	0	10	0
Sowing, -	0	0	3
Three buſhels ſeed, -	0	9	9
Harrowing, - -	0	4	0
Hand-hoeing once, -	0	7	0
Pulling, - -	0	7	0
Harveſting, -	0	4	0
Thraſhing, - -	0	3	0
Rent, - -	1	2	0
Total, - -	3	7	0

Produce.

Two quarters, at 25 *s.* -	£. 2	10	0
Straw one load.	1	0	0
Total, - -	3	10	0
Expences, -	3	7	0
Profit, -	0	3	0

1769.

Ploughed the bean ſtubble in *March*, and harrowed in tares in *May*; the crop came but to little, not worth more than 5 *s.* an acre.

Expences.

Ploughing, - -	0	10	0
Sowing, -	0	0	3
Seed two buſhels, -	0	10	0
Harrowing, - -	0	1	6
Rent, - -	1	2	0
Total, - -	2	3	9
Produce, -	0	5	0
Loſs, - -	1	18	9

Recapitulation.

1769. Tares, loſs, -				1	18	0
1767. Oats, profit,	£. 0	12	10			
1768. Beans ditto,	0	3	0			
				0	15	10
Loſs, - -				1	2	11
Which is *per ann.* -				0	7	7

Obſervations.

Mr. *Arbuthnot* has had ſuch a variety of undertakings in the huſbandry way, that all his fields could not poſſibly receive equal attention. The loſs on this field has been firſt ſowing oats after wheat, and afterwards always ſowing it on one earth, which on a ſtiff clay cannot be right. It is a proof, that the common management of theſe lands yield a very poor advantage at beſt.

Experiment, No. 80.

Courſe.

1. Fallow	4. Wheat
2. Drilled barley	5. Oats.
3. Tares	

Five acres; ſoil a ſtrong loam on clay; fallowed in 1766, and in 1767 drilled with barley; for which crop ſee *Experiment*, No. 60. Loſs 2 *l.* 8 *s.* 4 *d.*

1768.

Harrowed in tares on two earths; mown for ſoiling horſes; kept ten three weeks, and yielded thirty ſhillings worth of ſheep feed beſides.

Expences.

Firſt ploughing,	£. 0	7	6
Water-furrowing,	0	0	6
Second ploughing,	0	7	6
Harrowing,	0	1	6
Two buſhels tares,	0	10	0
Mowing and carting,	0	5	0
Rent,	1	2	0
Total,	2	14	0

Produce.

Keeping ten horſes four weeks, at *7s. 6d.*—*15l.*; the fifth is	3	0	0
Sheep feed 30*s.*; the fifth is	0	6	0
Total,	3	6	0
Expences,	2	14	0
Profit,	0	12	0

1769.

Harrowed in wheat on one ploughing; produce three quarters *per* acre.

Expences.

Ploughing,	0	7	6
Harrowing,	0	1	6
Two buſhels ſeed,	0	13	0
Striking furrows,	0	0	9
Water-furrowing,	0	1	0
Reaping,	0	8	6
Harveſting,	0	4	0
Carry over,	1	16	3

Brought over, —	£. 1	16	3
Thraſhing, — —	0	9	0
Carrying, — —	0	1	6
Rent,	1	2	0
Total, —	3	8	9

Produce.

Three quarters, at 44 *s.* —	6	12	0
One load ſtraw, —	1	5	0
Total, — —	7	17	0
Expences, — —	3	8	9
Profit, — —	4	8	3

1770.

Harrowed in oats on one earth: clover was ſown on the wheat, but it miſcarried, which was the reaſon of ſowing oats; for clover was wanting, under which crop it now is, and very fine. Product 3 quarters *per* acre.

Expences.

Ploughing, — —	0	5	0
Harrowing, — —	0	2	0
Three buſhels ſeed, —	0	7	6
Sowing, — —	0	0	3
Water-furrowing, —	0	1	0
Striking water-furrows,	0	0	2
Mowing, —	0	2	0
Carry over, —	0	17	11

Brought over, -	£. 0	17	11
Harveſting, - -	0	5	0
Thraſhing, - -	0	4	6
Rent, - - -	1	2	0
Total, - -	2	9	5

Product.

Three quarters, -	3	0	0
Straw one load, -	0	16	0
Total, - -	3	16	0
Expences, -	2	9	5
Profit, - -	1	6	7

Recapitulation.

1768. Tares, profit, -	0	12	0
1769. Wheat ditto. - -	4	8	3
1770. Oats ditto, - -	1	6	7
Total, - -	6	6	10
1767. Drilled barley, loſs,	2	8	4
Profit, - -	3	18	6
Per ann. -	0	15	8

Experiment, No. 81

Courſe.

1. Madder. - 2. Ditto. 3. Ditto. 4. Ditto.

Six acres. For the crops, ſee *Experiment*, No. 13.

G4

Loſs, - -	£. 68	14	0
Which is *per* acre,	11	9	0
And *per* acre *per ann.*	2	17	3

This loſs is however but in appearance: ſuch numbers of plants were drawn from it, that, if reckoned, as they are elſewhere, the profit would be very great.

Experiment, No. 82.

Courſe.

1. Madder. 2. Ditto. 3. Ditto.

Nine acres: the crop regiſtered in *Experiment*, No. 10. Profit 211*l.* 12*s.* 4*d.* *Per* acre 23*l.* 10*s.* 3*d.* *Per* acre *per ann.* 5*l.* 17*s.* 6*d.*

Experiment, No. 83.

Courſe.

1. Fallow
2. Madder
3. Madder
4. Ditto.

Ten acres. See *Experiment*, No. 14. Profit 333*l.* 6*s.* which is *per* acre 33*l.* 6*s.* 7*d.* and *per* acre *per ann.* 8*l.* 6*s.* 7*d.*

Experiment. No. 84.

Courſes.

1. Fallow
2. Madder
3. Madder
4. Ditto.

Three acres. See *Experimant*, No. 15.

Profit, -	£. 105	7	6
Or *per* acre, -	35	2	6
Per acre *per ann.* -	8	15	7

Experiment, No. 85.

Courſe.

1. Turnips. 2. Turnips. 3. Turnips.

Two acres; the ſoil a black rich loam.

1767.

Trench-ploughed ſome lucerne, and harrowed in turnips: they were drawn for ſheep, at 4*l.* an acre.

Expence.

Trench-ploughing with *Ducket*'s plough, - -	£. 0	13	0
Harrowing, -	0	2	0
Sowing, - -	0	0	3
Seed, - - -	0	0	6
Twice hand-hoeing, -	0	10	0
Rent, &c. - -	1	6	0
Total, - -	2	11	9

Product.

By ſheep feed, - -	4	0	0
Expences, -	2	11	9
Profit, - -	1	8	3

1768.

Trench-ploughed it again, and harrowed in turnips, fed on the land by ſheep, 3*l.* an acre.

Expences.

Ploughing,	£. 0	13	0
Harrowing and ſowing,	0	2	9
Seed,	0	0	6
Twice hand-hoeing,	0	10	0
Rent, &c.	1	6	0
Total,	2	12	3

Produce.

Sheep feed,	3	0	0
Expences,	2	12	0
Profit,	0	8	0

1769.

Trench-ploughed again for turnips, as before ; fed with ſheep, 3 *l.* 10 *s.* *per* acre.

Product.

Sheep feed,	3	10	0
Expences as before, except but one hoeing,	2	7	3
Profit,	1	2	9

Recapitulation.

1767. Turnips, profit,	1	8	3
1768. Ditto, ditto,	0	8	0
1769. Ditto, ditto,	1	2	9
Total,	2	19	0
Per annum,	0	19	8

But in addition to this profit is that very great one of feeding on the land by ſheep, which is certainly more than 19*s*. 8*d*. a year.

Experiment, No. 86.

Courſe.

1. Fallow
2. Madder
3. Madder
4. Madder.

Four acres; regiſtered in *Experiment*, No. 12.

Profit, -	£. 97 19 4
Per acre, - -	24 9 10
Per acre *per annum*,	6 2 5½

Experiment, No. 87.

Courſe.

1. Lucerne
2. Lucerne
3. Lucerne
4. Lucerne
5. Lucerne.

Twelve acres. See *Experiment*, No. 5. Profit *per* acre *per ann.* 6*l.* 4*s.* 4*d.*

General Obſervations.

In order to draw thoſe really uſeful concluſions from the preceding regiſter of courſes, which they certainly will afford, it is neceſſary to ſtate them in one complete view, retaining no other circumſtances than the crops, and the clear profit or loſs.

Courſes that have proved profitable.

Experiment, No.		*Expended in manure.* l.	s.	d.	*Profit per acre per annum.* l.	s.	d.
62.	1. Peaſe, 2. Winter tares, 3. Fallow, 4. Wheat,	0	0	0	2	9	0
64.	1. Barley, 2. Clover, 3. Clover, 4. Wheat, -	4	5	6	3	19	8
66.	1. Oats, 2. Peaſe, 3. Fallow, 4. Wheat, -	2	5	6	1	10	1
67.	1. Beans, 2. Wheat. 3. Tares,	3	18	3	6	1	7
68.	1. Drilled beans, 2. Drilled wheat, 3. Drilled beans, 4. Winter tares, -	0	0	0	2	16	0
69.	1. Stubble, 2. Fallow, 3. Drilled wheat, 4. Drilled beans, -	1	8	6	0	6	7
70.	1. Fallow, 2. Drilled beans, 3. Wheat, 4. Drilled beans,	1	8	2	2	3	10
71.	1. Drilled peaſe. 2. Drilled wheat, 3. Beans, 4. Wheat,	2	13	0	1	9	4
72.	1. Drilled beans, 2. Ditto wheat, 3. Ditto beans, 4. Ditto wheat, -	2	10	0	3	15	2
73.	1. Fallow, 2. Drilled beans, 3. Ditto wheat, 4. Ditto beans, - -	0	19	0	1	1	11
73.*	1. Oats, 2. Tares, 3. Fallow, 4. Drilled wheat,	1	2	10	1	5	11
75.	1. Fallow, 2. Madder, 3. Madder, 4. Madder,	3	10	0	7	17	2
76.	1. Fallow, 2. Madder, 3. Madder, 4. Madder,	7	10	0	9	3	0
77.	1. Drilled barley, 2. Ditto beans, 3. Potatoes,	4	10	0	2	8	10
80.	1. Fallow, 2. Drilled barley, 3. Tares, 4. Wheat, 5. Oats,	0	0	0	0	15	8
82.	1. Madder, 2. Madder, 3. Madder, - -	3	12	6	5	17	6
83.	1. Fallow, 2. Madder, 3. Madder, 4. Madder,	6	0	0	11	10	7

Courſes that have proved profitable, continued.

Experiment, No.		Expended in manure.			Profit per acre per annum.		
		l.	*s.*	*d.*	*l.*	*s.*	*d.*
83.	1. Fallow, 2. Madder, 3. Madder, 4. Madder,	3	12	0	7	4	11
84.	1. Fallow, 2. Madder, 3. Madder, 4. Madder,	6	0	0	8	15	7
85.	1. Turnips, 2. Turnips, 3. Turnips, –	0	0	0	0	19	8
86.	1. Fallow, 2. Madder, 3. Madder, 4. Madder,	2	4	0	6	2	5½
87.	1. Lucerne, 2. Lucerne, 3. Lucerne, 4. Lucerne, 5. Lucerne, –	0	0	0	6	4	4

Courſes that have been attended with loſs.

		Manure.			*Loſs.*		
63.	1. Fallow, 2. Spring tares, 3. Wheat, 4. Oats,	1	1	6	0	2	2
65.	1. Tares and flax, 2. Fallow, 3. Tares, 4. Wheat,	1	1	6	0	6	9
74.	1. Oats, 2. Drilled peaſe, 3. Barley, –	6	15	0	0	5	2
78.	1. Drilled barley, 2. Beans, 3. Turnips, –	5	4	0	2	1	9
79.	1. Oats, 2. Beans, 3. Tares,	0	0	0	0	7	7
81.	1. Madder, 2. Madder, 3. Madder, 4. Madder,	0	0	0	2	17	3

The firſt object that ſtrikes one here is, the vaſt profit attending ample manurings; by dividing the table, this will appear deciſive.

In the laſt line of the preceding page, *for* 11 *l.* 10 *s.* 7 *d.* *read* 8 *l.* 6 *s.* 7 *d.*

Courſes manured for above 3 l. an acre.

				Profit.		
No. 64,				£. 3	19	8
67,				6	1	7
75, Madder,				7	17	2
76, Ditto,				9	3	0
77,				2	8	10
82, Madder,				5	17	6
83, Ditto,				8	6	7
83, Ditto,				7	4	11
84, Ditto,				8	15	7
Total,				59	14	10
74, Loſs,	£. 0	5	2			
78, Ditto,	2	1	9			
				2	6	11
Total,				57	7	11
Average,				5	4	4

Courſes manured for under 3 l. an acre.

				Profit.		
No. 66,				1	10	1
69,				0	6	7
70,				2	3	10
71,				1	9	4
72,				3	15	2
73,				1	1	11
73*,				1	5	11
86,				6	2	5½
Total,				17	15	3½
63, Loſs,	0	2	2			
65,	0	6	9			
				0	8	11
Total,				17	6	4½
Average,				1	14	7

Unmanured crops.

No. 62, Profit, -				£. 2	9	0
68, - -				2	16	0
80, - -				0	15	8
85, - -				0	19	8
Total, - -				7	0	4
79, Loſs,	£. 0	7	7			
81, Madder,	2	17	3			
				3	4	10
Total, - -				3	15	6
Average, -				0	12	7
Lucerne profit,				6	4	4

Madder excluded the account will be thus.

Manurings above 3 l. an acre.

No. 64, Profit, - -				3	19	8
67, - -				6	1	7
77, - -				2	8	10
Total, -				12	10	1
74, Loſs,	0	5	2			
78, Ditto, -	2	1	9			
				2	6	11
Total, -				10	3	2
Average, - -				2	0	7

Manurings under 3 l. an acre.

Average profit, as before,	£. 1	14	7

The unmanured crops.

No. 62, 68, 80, and 85,	7	0	4
79, Loſs, - -	0	7	7
Total, - -	6	12	9
Average, -	1	6	6

Manured for above 3 l. -	2	0	7
Under 3 l. -	1	14	7
Superiority, -	0	6	0

Above 3 l. - -	2	0	7
Unmanured, - -	1	6	6
Superiority, -	0	14	1

Under 3 l. - - -	1	14	7
Unmanured, -	1	6	6
Superiority, -	0	8	1

Lucerne is excluded, which is ſo uncommonly profitable without manuring, that it would overturn all concluſions.

From this view of the crops, with an eye to manures, it is very evident, that *profit* depends very much on *manure*, and that the degree of the one is very intimately connected with the other. This is a general reſult; but not ſo important as a more particular one. From examining the courſes, it appears, that very ample manurings will be but loſing, unleſs the *courſe* is good: thus, in 74 and 78, drilled peaſe and drilled barley are introduced, both crops improper for this ſoil; ſo that manuring of 6*l.* 15*s.* and 5*l.* 4*s.* are attended only with loſs. No. 68, though unmanured, pays 2*l.* 16*s.* profit; whereas No. 80, unmanured, pays but 15*s.* 8*d.* This is owing to drilled beans being in one, and drilled barley in the other.

The moſt profitable courſes are;

No. 64. 1. Barley, 2. Clover,
3. Clover, 4. Wheat: it pays £. 3 19 8
No. 67. 1. Beans, 2. Wheat,
3. Tares, - - 6 1 7
No. 72. 1. Beans, 2. Wheat,
3. Beans, 4. Wheat: all drilled, 3 15 2

Hence it is evident, that the moſt profitable method of manuring theſe ſoils is to make clover, beans and tares, the fallow crops, and to have wheat the only white corn one. This will be further illuſtrated by ſelecting the next rank of profitable crops.

No. 68. 1. Drilled beans, 2. Ditto wheat, 3. Ditto beans, 4. Winter tares, - -	£. 2	16	0
No. 70. 1. Fallow, 2. Drilled beans, 3. Wheat, 4. Drilled beans, - -	2	3	10
No. 77. 1. Drilled barley, 2. Ditto beans, 3. Potatoes, -	2	8	10

The drilled barley was unprofitable; this profit was therefore on the beans, &c. This ſcale of profit ſhews evidently the beneficial courſes; as to barley, oats, and turnips, they are comparatively contemptible to the ſuperior crops of clover, beans, tares, and wheat. Potatoes are but once tried; but they bid extremely fair for exceeding any.

Wheat appears to pay very well for a complete ſummer fallow.

If a hint is taken from theſe courſes, ſuch an one as the following may probably be found uniformly advantageous.

1. Fallow
2. Wheat
3. Beans drilled
4. Oats
5. Clover
6. Clover
7. Wheat
8. Winter tares
9. Beans
10. Wheat
11. Potatoes
12. Oats
13. Clover
14. Wheat.

It may be ſuppoſed I introduce the oats merely as an introduction to the clover, and for the ſake of ſome ſtraw, in caſe it could not be bought. A farm thus diſpoſed would be,

Four	Fourteenths	in	Wheat.
Two	Ditto		Oats.
Two	Ditto		Beans.
One	Ditto		Tares.
Three	Ditto		Clover.
One	Ditto		Potatoes.
One	Ditto		Fallow.

I mention nothing of cabbages, becauſe they are not yet experienced on this farm.

Eight fourteenths, cleanſe and ameliorate.

Six ditto, foul and exhauſt.

The land therefore muſt always be clean and in good heart.

This for common huſbandry; but the great profit is to manure very richly, and plant madder. The clear profit of the madder courſes far exceeds the common ones; but lucerne, without any manure at all, comes nearly to madder with great quantities.

VI. MISCELLANEOUS EXPERIMENTS.

Mr. *Arbuthnot*'s attention to huſbandry has been in no reſpect confined: ſome objects, as may be eaſily conceived, have demanded more ſpirited efforts than others; but very few have been neglected. It will, for the ſake of clearneſs, be requiſite to throw thoſe enquiries, which have not been made in ſo extended a manner as the reſt, into a diviſion by themſelves. They will be properly arranged under the following heads.

1. Manures
2. Draining
3. Deep ploughing
4. Velvit wheat
5. Growth of wheat.
6. Feeding wheat
7. Carrots
8. Deſtroying thiſtles
9. Black bent
10. Sheep
11 Planting poplars

MANURES.

This gentleman, in his culture of madder, &c. has manured various of his fields in a much richer manner than I remember any where to have ſeen: it has been done with farm-yard dung, raiſed at home, and alſo with large quantities purchaſed at *London*: this practice has been carried on in ſo large a ſcale, that the experimental regiſter of it, unleſs various diviſions had been made with infinite trouble, could not be deciſive. His general manuring therefore is not to be gathered from the following trials, which are upon a different plan. The manures tried are, trotters, wood aſhes, ſoot, coal aſhes, rabbit dung, malt duſt, night ſoil, folding ſheep.

TROTTERS.

Experiment, No. 88.

This manure was tried on both ſtrong and light loam for wheat, and alſo for madder, 5 quarters *per* acre, at 9*s.* beſides carriage from *London*. They were not attended by any viſible advantage in either crop, which he attributes to their going through the hands of the glue makers.

WOOD ASHES.

Experiment, No. 89.

Sowed them on arable lands in various fields; 25 buſhels an acre; but they yielded no ſort of advantage.

Experiment, No. 90.

Tried them on graſs land; the benefit there was great. The farmers were of opinion, that dreſſing would burn up the graſs, which would be the caſe if laid in heaps to be ſtrewed; on which account they muſt be ſpread directly out of a little cart. They were collected from *Banſtead* downs, at 3*d.* a buſhel.

SOOT.

Experiment, No. 91.

Sowed 30 buſhels an acre on graſs land, at 7 *d.* a buſhel, beſides carriage and 1 *d.* ſowing. From various trials, the effect was found to be very great, if done early in *February*, and equally beneficial ſown on green wheat at the ſame time.

COAL ASHES.

Experiment, No. 92.

A compariſon was formed between coal aſhes and ſoot, on graſs land: the aſhes were ſifted remarkably fine; 40 buſhels *per* acre were ſown of each.—At firſt the ſoot made the greateſt appearance; but there was no viſible difference in the crop of hay.

RABBIT's DUNG.

Experiment, No. 93.

This is the principal top dreſſing uſed by Mr. *Arbuthnot*: he has tried it on almoſt all the fields of his farm. He ſows 25 ſacks an acre over moſt of his wheat in *March*, at 1 *s.* 2 *d.* a ſack, carriage included; and this is in general the only manure he uſes for his wheat: on the drilled crop it was hoed in, and on the broad-caſt harrowed. The advantage in general very great.

Experiment, No. 94.

In *November*, a compariſon was made between rabbit's dung, chicken's dung, and wood aſhes, in the proportion *per* acre of 18 ſacks of each. The chicken's dung was by far the beſt, the rabbit's next, and the wood aſhes laſt.

MALT DUST.

Experiment, No. 95.

Fifty buſhels an acre of kiln duſt were tried againſt 20 ſacks of coal aſhes on arable land, and turned out much ſuperior.

NIGHT SOIL.

Experiment, No. 96.

Tried for cabbages and madder, 10 loads an acre. It promiſes greatly.

FOLDING SHEEP.

Experiment, No. 97.

Mr. *Arbuthnot* has been ſo well convinced of the great importance of the ſheep fold, that his conſtant practice, when the land is not dry enough for the common one, is to pen them in a ſtanding fold on a head land, well littered with ſtraw every day, or every other day, as circumſtances admit, ſo as the ſheep may always be dry.

One hundred and thirty-four ſheep and 30 lambs penned in this manner 6 weeks were littered with 5 loads and 40 truſs of oat ſtraw, (40 *lb.* to the truſs.) They made 28 large loads of dung. They were fed morning and evening with turnips in the pen, and let out in the middle of the day for 4 or 5 hours. In the above time eat 2 acres of turnips. The dung thus made was equal to any that can be had; full as good as what he brings from *London* at 10*s.* a load.

Suppoſe the quantity 20 ſuch loads as brought from *London*, - -	£. 10	0	0
Five loads and 40 truſs, at 20 at the pen,	5	15	0
Profit by the dung, -	4	5	0
Which is *per* acre for the turnips,	2	2	6
And *per* ſcore *per* week for the ſheep, - -	0	1	9¼

This trial ſhews the advantage of ſuch folding in the cleareſt manner; it alſo proves that a very high price may be paid for ſtraw with great profit: 20*s.* a truſſed load is high; but had 30*s.* been given, there would yet have remained a conſiderable profit. It is true, there is a great advantage by eating the turnips on the land where they grow; but that can only be done in dry ſoils, whereas this method is applicable to all.

DRAINING.

Experiment, No. 98.

Seven acres of arable land and four of graſs were drained by covered drains: furrows were drawn by the common ploughs, 8 inches deep, to mark out the cuts; they were then dug with draining-ſpades, to the depth of 20 inches, at the expence of 3 *d.* ½ *per* perch digging, filling, &c. They were ſtruck in parallel lines diagonally acroſs the ſlope of the fields, at the diſtance of 2 perch from each other; but Mr. *Arbuthnot* remarks, that to drain his land properly, the cuts ſhould be but one rod aſunder. They were filled with thorns, 2 loads of which filled the drains of an acre.

Suppoſe an oblong, 40 perch long, and 12 broad, it contains 3 acres.

In the above method of draining, there will be 5 drains, each 40 perch long, or 200 perch, which at 3 *d.* ½ come to, for 3 acres, - -	£. 2	18	4
Carry over, -	2	18	

Brought over, -	£.	2	18	4
Drawing furrows, -		0	1	8
Three acres, -		3	0	0
Which is *per* acre,		1	0	0
Two loads of thorns, ſuppoſe		0	15	0
Total *per* acre, -		1	15	0

Experiment, No. 99.

The expence of the above drains being ſomething conſiderable, and good hands uſed to the work, not being always to be had, Mr. *Arbuthnot* deferred the draining his whole farm, until he could invent a plough that would perform the operation. In this deſign he ſucceeded, and with the plough drained 26 acres of graſs land, the drains 2 perch aſunder, as above, 17 inches deep, 2 wide at bottom, and 8 ½ at top. Filled like the others with thorns; but from the cuts being truer, and narrower at bottom than they can be dug, 1 load of thorns filled 70 perch. Twelve horſes were uſed, and the whole expence of ploughing, filling, &c. came to 1 *d.* *per* perch.

200 Perch, at 1 *d.* on 3 acres,	£.	0	16	8
Which is *per* acre, -		0	5	6 ½

	£.	s.	d.
Brought over,	0	5	6½
One load thorns, -	0	7	6
This is ſomething over the truth.			
Total *per* acre, -	0	13	0½
Expence *per* acre with the ſpade,	1	15	0
With the plough, -	0	13	0½
Superiority, -	1	1	11½

This prodigious ſaving, which, in a few acres, would at once pay the expence of the implement, ſhould call the attention of all, who have any quantity of land to drain in this manner With this noble implement the trouble and expence of covered drains are reduced to a trifle, to much leſs than one crop of any ſort would pay.

But here I ſhould obſerve, that this experiment was made with the plough, before it was perfected by adding wheels of five feet inſtead of the former ones of two feet: he has reduced the draft four horſes; ſo that it is now worked with only eight, conſequently will do its work cheaper than mentioned in the above calculation. For an explanation ſee plate XV.

DEEP PLOUGHING.

This part of huſbandry Mr. *Arbuthnot* has practiſed upon the largeſt ſcale, and with very great ſucceſs. His ſoil is chiefly a ſtrong loam, never ploughed before more than five inches deep: he has ſtirred it 12 inches, and the additional ſeven are a ſtrong brick earth. He always begins with a winter fallow, and leaves it through the winter for beans, on one ſpring ploughing. No manuring, except ſome with lime. The beans very good crops: much too good to give the leaſt reaſon to ſuppoſe them the worſe for the deep ploughing, eſpecially as the ground was in general very foul and poor. The beans have been followed by various other crops, none of which have indicated any ill effect from deep ploughing.

He makes it a rule, never to ſow any fibrous-rooted crop for the firſt after this operation. He once ſowed barley on it, and laid down to clover: the barley a poor crop; but the clover took perfectly well: it was dunged, and yielded a very large product; alſo one the ſecond year, after which it was fed, and trench-ploughed for wheat. The crop four quarters an acre, though it appeared to be much hurt by the worm, and was fed bare with ſheep in *March*.

VELVIT WHEAT.

Experiment, No. 100.

In 1768, Mr. *Arbuthnot* gathered ſix ears of this wheat, from the down on it attracting this notice; and carrying it to market, the farmers remarked that they knew it, but had loſt the ſort, and called it velvit wheat. This induced him to ſow it ſeed by ſeed in 1768. He took off the tillers and tranſplanted them, which operation he repeated, and planted them in the middle of a field of beans, to avoid blending the different *farina* of the wheats. In doing this he obſerved, that the tranſplanted plants run away for ſeed before their own tillers came into ear; ſo that if this method was practiſed in common, there would be a fortnight difference in the ripening of the ears of the ſame plant: for which reaſon it is a mere matter of curioſity.

The product of the ſix ears was 14 quarts, which were drilled on one acre, in four rows, eight inches aſunder, on four-feet lands: ſome of it in double rows, 14 inches, on the ſame ſize lands: they were both hand and horſe-hoed ſufficiently, to keep them quite clean. In harveſt, the products of the two ways of drilling were blended together through hurry; but the total was three quarters three pecks; which quantity, from leſs than two pecks of ſeed, he juſtly eſteems a very great produce, and attributes it to the ſort of wheat. The land had been ploughed 14 inches deep for madder. Such a crop ſhews the good effect of both deep ploughing and madder, in preparing for wheat.

He propoſes ſowing it all this year, after which the ſort will be fully regained.

GROWTH OF WHEAT.

Experiment, No. 101.

Mr. *Arbuthnot*, receiving a hint from Dr. *Fordyce*, on the different ſucceſſion of the roots of plants, and finding the ſame clearly laid down in a manuſcript, ſaid to be written by Dr. *Cullen*, Profeſſor of Chemiſtry at *Edinburgh*, who explains the nature of the roots of all culmiferous plants in the following words: "Culmiferous plants have three ſets of fibres: the firſt ſet is formed on the radicle, the ſecond ſet is formed above this at a knot on the plumula; the third, at a knot in the plumula, above the ſecond: this the diſcovery of *Bennet*. Upon the due formation of theſe three knots and ſets of fibres, I judge the tillering of frumentaceous plants does entirely depend: that if theſe knots are imperfectly formed, the plant imperfectly tillers." Theſe three knots are termed by *Bennet*, the infancy, the adoleſcence, and maturity of the plant. At the two uppermoſt knots the tillering is formed.

Mr. *Arbuthnot* was hence induced to ſow a few grains in water, to watch the ſucceſſion of the roots. He cut a hole an inch ſquare in a bung-cork, in which he laid ſome wool, and upon that three grains of white wheat, and floated on water in a glaſs tube 18 inches long. Firſt there were three fibres ſhot from the radicle, which branched into innumerable fibres; upon the wheat ſpearing freſh fibres ſtruck out, as deſcribed by Dr. *Cullen*. Soon after they were eſtabliſhed, the three firſt fibres with their branches gradually decayed; as ſoon as it was in ear, the freſh fibres made their appearance, ſoon after which the ſecond decayed, and the laſt remained in poſſeſſion of the water. The roots ſtraightened, when taken out of the water, meaſured 2 ½ feet long. It bloſſomed and ripened in its regular courſe; each ear had one grain; ſowed one of the grains in the open garden, and when proper to ſeparate the tillers, it was done, and again a ſecond time, to the amount in all of 98 plants. They promiſed to produce a great burthen; but being near a hedge, the birds eat them: the wheat very fine.

Tried the ſame experiment in another glaſs, mixed with ſome wood aſhes: the ſeed rotted on the ſurface, owing, as ſuppoſed, to the quantity of wood aſhes being too great. The motive was to ſee if it would lead to any diſcoveries of the cauſe of ſmut; for Mr. *Arbuthnot* apprehended that diſeaſe to be owing to a want of proper nouriſhment in the laſt ſucceſſion of roots: the grain then being in a mucilaginous ſtate, there may not be a ſufficient quantity of food to carry it through that ſtate. He has obſerved, that part of a field, which has been full of weeds, ſmutted when the reſt has eſcaped; and likewiſe, that when ſtrong land has been much poached in ſowing, and afterwards baked, whether on the head-lands or middle of the field, ſuch parts have been moſt ſubject to ſmut, owing, as he believes, to the ſurface of the earth not being pervious enough to admit the laſt ſet of fibres, which it is to be obſerved firſt ſhoot from the pumula into the open air, and then introduce themſelves into the ſurface, frequently at the diſtance of three quarters of an inch. This fact Mr. *Arbuthnot* has many times remarked, in examining the roots of field wheat.

FEEDING WHEAT.

Experiment, No. 105.

This gentleman, from obſerving the effect of feeding wheat in the ſpring, apprehends it to be very beneficial to a thin crop, and as prejudicial to a thick one: the feeding makes it tiller; but then it ſhould be done by turning in a flock, that will eat it down in two or three days, and not by a few, who will pick and cull the ſhoots.

In *March*, 1770, he turned his flock into one half of a wheat field, intending to eat that half quite down to the ground, and to leave the other untouched. Wet coming on, obliged the ſheep to be removed; nor could they afterwards be put in again, as the wheat began to ſpine. The ſide of the field fed appeared rather the better crop of the two.

CARROTS.

Experiment, No. 106.

Sowed carrot ſeed in *March*. When the plants were 2 inches high, ſome were transplanted; it was about the middle of *May*. In drawing them up, the ends of the taproots were broken off. This idea of transplanting carrots aroſe from the great expence of hoeing that crop, much of which would be ſaved by this practice. One of the plants taken up at random in *September*, weighed 3 *lb.*; the top 1 *lb.* the root 2 *lb.* The principal root for 4 inches deep was 4 in diameter; and then branched into five fine ſtraight roots.

Experiment, No. 107.

Mr. *Arbuthnot* having obſerved in *Eaſt-Frizeland*, that it was the cuſtom to ſow carrots in the ſpring on wheat and rye, and to harrow the ſeed in, he was induced to try it in 1768. The field a ſtrong loam on clay. In *May* he drilled a row of carrots between two of wheat, at 14 inches, on 3 ½ feet lands, and alſo broad-caſt over ſeveral acres. The ſeed was mixed with bran, in which manner his drill delivered it very regularly. After the wheat was reaped, they were hand-hoed; the produce 40 buſhels *per* acre. And this practice he thinks may turn out profitable on light deep ſoils. In *Frizeland* it is the cuſtom to plough them up and houſe, or to turn their hogs into the field, and eat them on the land.

Obſervations.

The carrot being a tap-rooted plant, in all probability the damage they do the wheat is inconſiderable, or at leaſt not to be named with a product of 40 buſhels an acre. Carrots are very well worth 1 *s.* a buſhel in feeding cattle; 40 *s.* an acre, added to the wheat, is an object of no ſlight magnitude; beſides, it is obſervable, that theſe were drilled ſo late as *May*, which is at leaſt two months too late; alſo, that the ſoil is very ſtiff, inſtead of being light, which is what the root delights in: upon the whole, it is fairly to be preſumed, that the practice may prove beneficial on many ſoils. Another circumſtance is the ploughing, which the land gets at *Michaelmas* for raiſing them, which it otherwiſe perhaps would not have.

DESTROYING THISTLES

Experiment, No. 108.

In a large field laid to graſs, the land having been very foul, innumerable thiſtles afterwards appeared; they were repeatedly ſpudded without any effect—they were repeatedly mown with no better: after this they were ſuffered to ſtand till juſt going to bloſſom; the heads only were then cut off: this appeared to weaken the plants. They put out lateral ſhoots only from the ſtem, whereas thoſe that were ſpudded put out numberleſs tillers; but ſtill they were not deſtroyed. Mr. *Arbuthnot* having remarked, that rolling in the ſpring, while the land is wet, was fatal to the crop of graſs, determined to roll this land when very wet, with an heavy roller: he accordingly did it, and the effect has been ſo great, that ſince this operation ſcarcely a thiſtle has appeared; but he ſpoiled his crop of hay.

In other fields he has mown, and then bruiſed them with the heavy roller in dry weather, but without any effect.

BLACK BENT.

This weed, called in ſome places mouſe tail, is more difficult to extirpate than many other annuals; but Mr. *Arbuthnot* has found the following method very effectual.

Plough up the ſtubble in *September*, and leave it for the winter: in ſpring, pulverize it as ſoon and as fine as poſſible; ſo let it remain for the bent to vegetate: then plough it up and ſow ſummer tares, or any thing that comes off ſoon enough to leave time for ploughing it well before winter. Lay it up on the ridge, to be ſecure from rain; if the black bent ſprings again, plough the whole ſurface of the land with the ſhim, after which harrow and leave it for ſowing wheat under furrow, ſhallow, and very late. This method is alſo good for the deſtruction of all ſeed weeds, if no couch is in the land: drilled crops, by admitting the hand-hoe, are excellent in deſtroying it.

SHEEP.

Experiment, No. 109.

Mr. *Arbuthnot* having 20 ewes with their lambs put to turnips in *February*, in three days the ewes ſhewed the appearance of the laſt ſtage of the rot, though not perceptible before; their wool quitting the ſide on the leaſt touch, their eyes of a yellow livid colour, not the leaſt redneſs remaining in their gums, and the wax on the ſide of their udders being quite dry: many of them ſcarcely able to walk. They were taken from turnips and put in a pen, having nothing to eat but dry meat, hay, ground beans and bran, ſprinkled with ſalt: they loathed their food, ſeemingly for want of moiſture: forge water, mixed with the water out of the madder copper, was given them, being a ſimple decoction of madder, and this they drank regularly.

Next, they had each a doſe of calomel and rhubarb, the ſame quantity as to a grown perſon: this purged them extremely, and brought away a moſt fetid, nauſeous, ſlimy matter. As ſoon as they knit, they had ſoap and bark given them every other morning; upon which they began to thrive, and the ſymptoms of health appeared in the above-mentioned circumſtances. The lambs were ſuffered all the time to run in and out the pen. Three ewes only died; the reſt have borne lambs ſince, and are now fatting,

This ſucceſs induced him to procure ſome rotten ſheep from a farmer in the neighbourhood, who ſent him four wethers in a cart, ſo bad that they could not walk: one died on the road. Theſe had not the ſymptoms above mentioned ſo ſtrong as the 20 ewes, but had water-bladders under the gullet; in this he put a ſeaton of turpentine, and treated them like the reſt. All died;

and, what is extraordinary, Mr. *Neal* (the farmer from whom he had them) ſaved all his flock, though many of them as bad as theſe, by giving them a ſpoonful of turpentine in a gill of water, once in three days.

Reſpecting the breed of ſheep, Mr. *Arbuthnot* was recommended to try the *Northampton* and *Leiceſter* ſort; but they did not well with him: they would not thrive, owing, as he apprehends, to the paſture not being rich enough: when fat, they came to 35 *lb.* a quarter. The quality of their wool declined. He finds from experience, that the *Wiltſhire* and *Hampſhire* ſuit him beſt. The *Dorſets*, bought in in lamb, and kept in the incloſures, fatten their lambs well; but muſt themſelves be fattened off by *Michaelmas*, as they are too delicate for the commons of this country.

PLANTING.

Experiment, No. 110.

Nine years ago planted ſome black poplars, eight feet aſunder; the ſize about 1 ½ inch diameter: meaſured two of them. No. 1. The beſt contains 13 feet of timber, which would ſell at 10 *d.* a foot, and the forks in the top would give three rails, worth with the faggots 2 *s.* In all 12 *s.* 10 *d.*

No. 2. The worſt, 12 ½ feet of timber, and the top wórth 1 *s.* In all 10 *s.* 5 *d.*

Average, 11 *s.* 7 *d.*

An acre planted in ſquares of 8 feet would contain 680 trees, which, at 11 *s.* 7 *d.* amount to - - -	£. 393	0	0
Expences.			
Suppoſe the trees bought or raiſed at 3 *d.* each, -	£. 8	10	0
Planting, -	0	5	0
Filling vacancies by death; ſuppoſe 50, - -	0	12	6
Fencing repairs, - -	0	10	0
Nine years rent, ſuppoſe at 30 *s.*	13	10	0
Total, - -	23	7	6
Product, -	393	0	0
Expences, - -	23	7	6
Profit, -	369	12	6
Which is *per* acre *per ann.*	41	1	4

No huſbandry or gardening in the world will equal this vaſt profit. It is aſtoniſhing that more plantations of ſuch quick-growing trees

trees are not made. This ſoil is a black, rich, low ground, near water.

Experiment, No. 3.

Some willows planted at the ſame time and diſtance, meaſured on an average 18 feet of timber, worth 6 *d.* a foot, and the tops 1 *s.* 6 *d.*

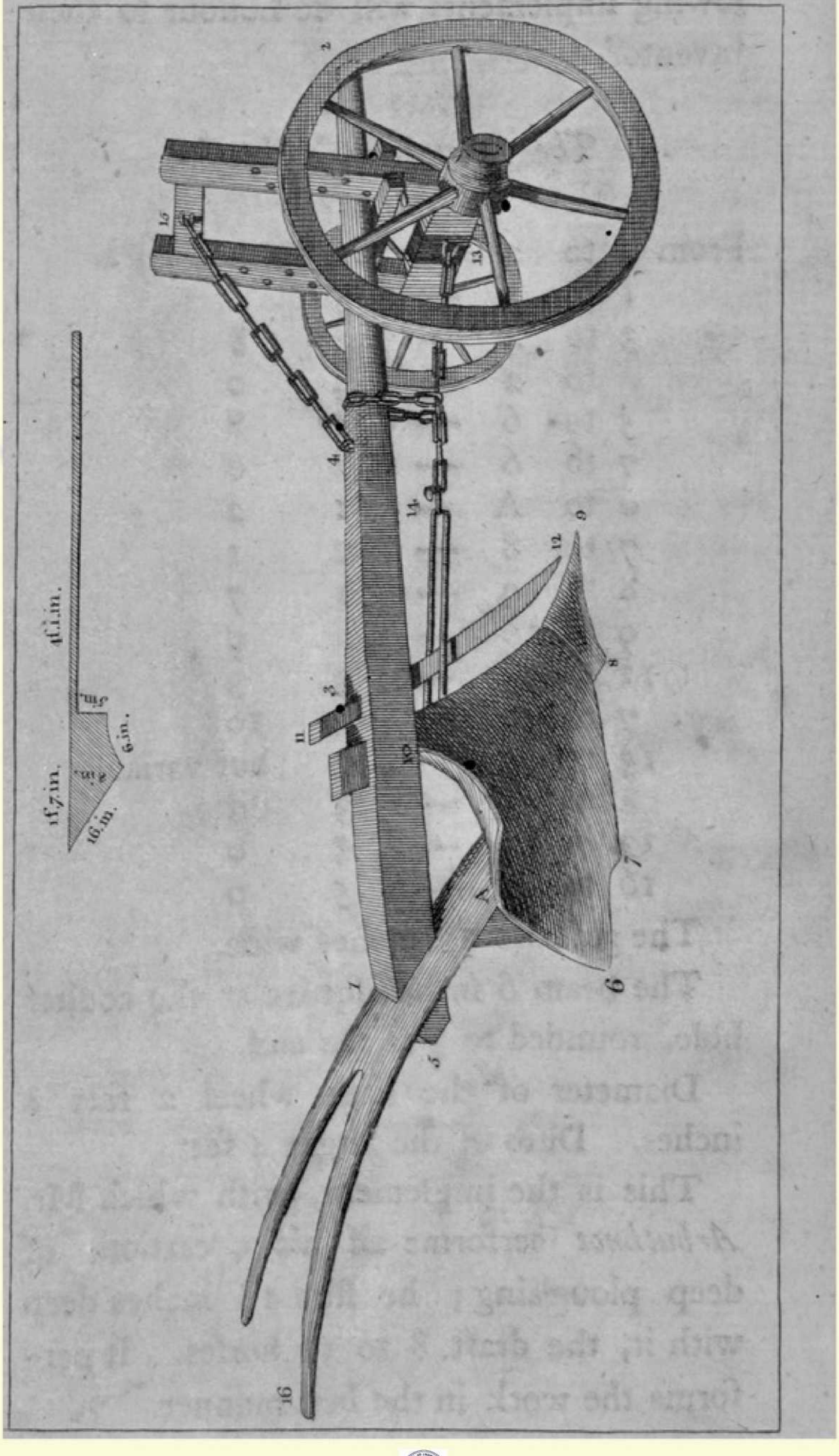
680, at 10 *s.* 6 *d.* -	£. 357	0	0
Expences as above, -	23	7	6
Profit, - -	333	12	6
Or *per* acre *per ann.*	37	1	4

From which moſt conſiderable return there is no ſlight reaſon to ſuppoſe the common idea, that this tree ſhould for profit have the head cut off, is an error; for it is a queſtion, whether the product by faggots would equal half this. But in ſituations, where poles ſell well, Mr. *Arbuthnot* obſerves, that you may cut them every ſix years, and ſell at an amazing price, but not for faggots. He likewiſe remarks, that the body of the willow tree rives into pales, which are admirable for fences, hardening in the air, and are nearly as durable as oak.

VII. IMPLEMENTS.

If a perſon, the leaſt ſkilled in agriculture, looks around for inſtruments that deſerve to be called complete, how few will he meet with! Every day brings to light new plans of culture, for the profitable execution of which peculiar inſtruments are neceſſary: it is often the want of theſe that caſts a damp on beginnings, which would otherwiſe turn out highly ſucceſsful; but being liable to numerous miſcarriages, and great expences, for want of the proper machines, the modes of culture are themſelves condemned. The new huſbandry, among other inſtances, may be quoted, which abſolutely depends on the merit of the implements uſed.

Mr. *Arbuthnot*, on his beginning this courſe of trials, experienced the inconveniences here mentioned, and this induced him to invent a great variety of moſt excellent machines ſubſervient to huſbandry, with which he has been enabled to carry ſeveral branches of culture to a perfection unknown before; and, at the ſame time, at a much lower expence, than was poſſible to be effected with the tools before in uſe. I will venture to aſſert, that the following


1f.7.in.
16.in.
8 in.
6.in.
5in.
4f.1.in.

lowing implements will do honour to their inventor.

Plate IX.

The great Wheel Plough.

References.

From	1	to	2	—	10 Feet	0 Inches.
	1	to	3	—	3	2
	3	to	4	—	2	8
	4	to	2	—	4	0
	5	to	6	—	1	8
	7	to	6	—	2	0
	6	to	A	—	1	2
	7	to	8	—	2	1
	8	to	9	—	1	7
	9	to	10	—	2	9
	11	to	12	—	3	3
	7	to	10	—	2	10
	13	to	14	—	3	but variable.
	4	to	15	—	3	ditto.
	13	to	15	—	3	0
	16	to	1	—	5	0

The gallows 17 inches wide.

The beam 6 inches ſquare at the coulter hole, rounded to 3 at the end.

Diameter of the little wheel 2 feet 4 inches. Ditto of the larger 4 feet.

This is the implement, with which Mr. *Arbuthnot* performs all his operations of deep ploughing; he ſtirs 18 inches deep with it, the draft 8 to 12 horſes. It performs the work in the beſt manner.

Plate X. Fig. 1.

The ſmall ſpiky Roller.

References

a to b	—	10 Feet	0 Inches.
b to c	—	3	0
b to e	—	2	10
e to f	—	3	0
g to i	—	1	8
g to n	—	2	0
k to l	—	2	3
i to m	—	0	6 Inches broad at bottom, 15 above the axle.

Diameter of the cylinder 1 foot 8 inches.

This roller, being drawn through any furrows, whether thoſe of beds in fallowing, or the intervals of drilled crops, &c. is of very great uſe in pulverizing them, when no horſe-hoe will have any effect.

Plate X. Fig. 2.

The Berkſhire Shim.

References.

a to c	—	10 Feet	0 Inches.
a to b	—	5	4
c to b	—	4	6
d to e	—	2	10
b to g	—	1	7
a to f	—	1	7
h to i	—	1	0

Diameter of the wheel 14 inches.

The

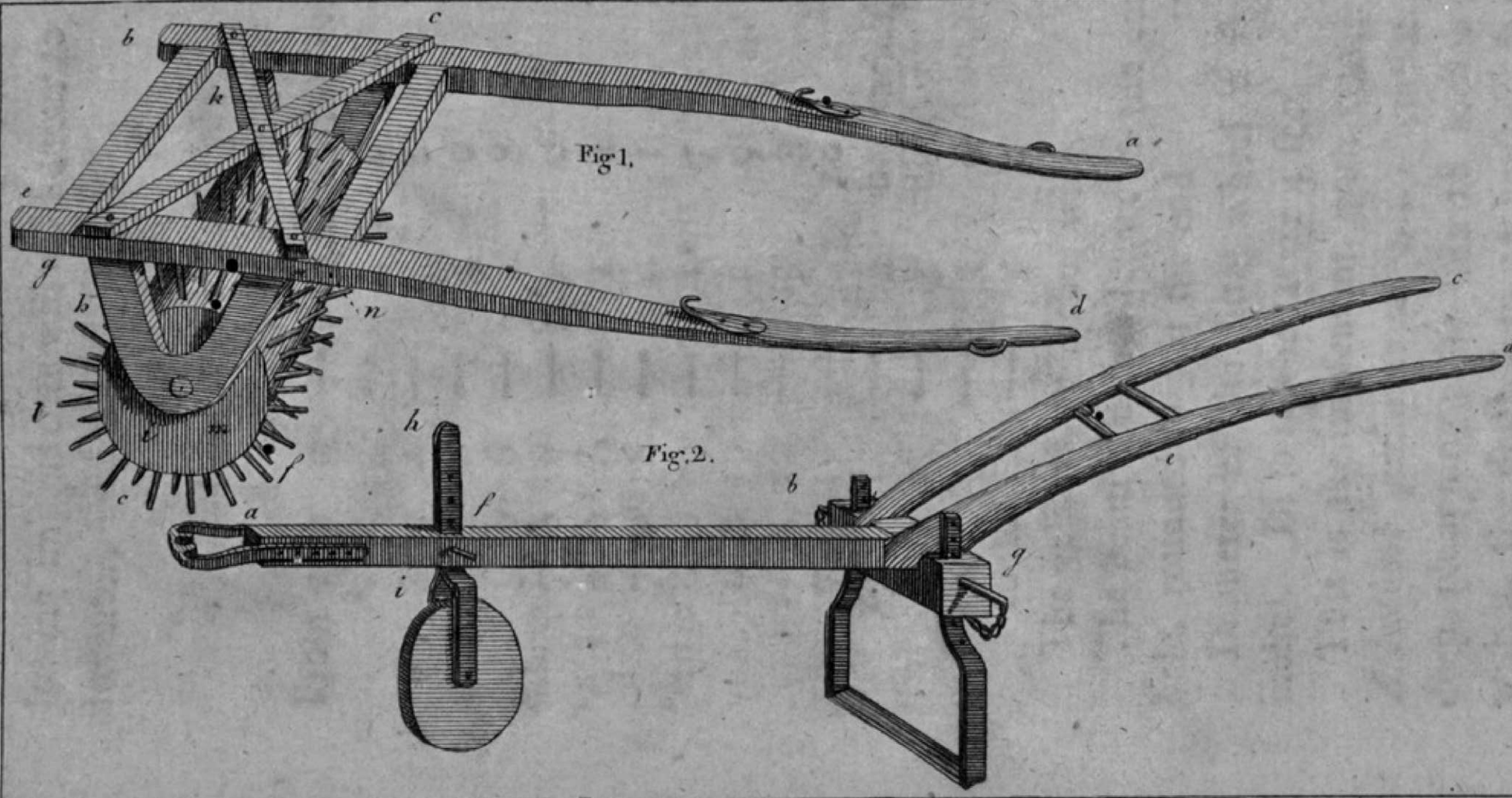


Fig. 1.

Fig. 2.

The ſhare 14 inches long at cutting part, and 10 at top; the bottom 4 inches wide: but ſhares of any ſize may be fixed in it.

The block 4 inches thick by 7 inches deep.

The beam 3 inches ſquare, rounded.

As the ſhim is here repreſented, it is 2 feet from the top of the block to the ground, and from the top of the beam to the ground, at the wheel, 20 inches.

The ſhare riſes or ſinks at pleaſure through the block, as does the wheel through the beam.

It will not here be improper to remark, that this tool is in *Berkſhire* no longer a common one, and that ſeveral gentlemen, who had tried it, laid it aſide as a bad inſtrument; which has ariſen from not attending ſufficiently to the variations of the wheel. Mr. *Arbuthnot* has improved it, by ſetting the ſhare into the earth, inſtead of leaving it flat, by which means the effect in cutting is much ſtronger. He has found a ſhim of incomparable uſe in anſwering the purpoſe of the hand hoe, cutting through all the weeds, and leaving them to die in the ſun. It is ſimple, and very expeditious. The price 2 *l.* 3 *s.*

Plate XI. *The double mould-board Plough.*

References.

Fig. I. *A perſpective view of the Plough.*

A. The ſhare, 22 inches long and 16 inches broad, riſing with an angular creſt on the middle of its upper ſurface.

B The coulter, its extreme length is 3 feet 2 inches, its breadth is 3 inches in the blade, and 1 ½ inch in the ſhank; inclining to the horizon about 40 degrees, and is 4 feet 2 inches diſtant from the point of the beam to the inner ſide of the mortiſe.

C. The falſe coulter and tuck, with an iron key or wedge driven through a mortiſe in the upper end of it.

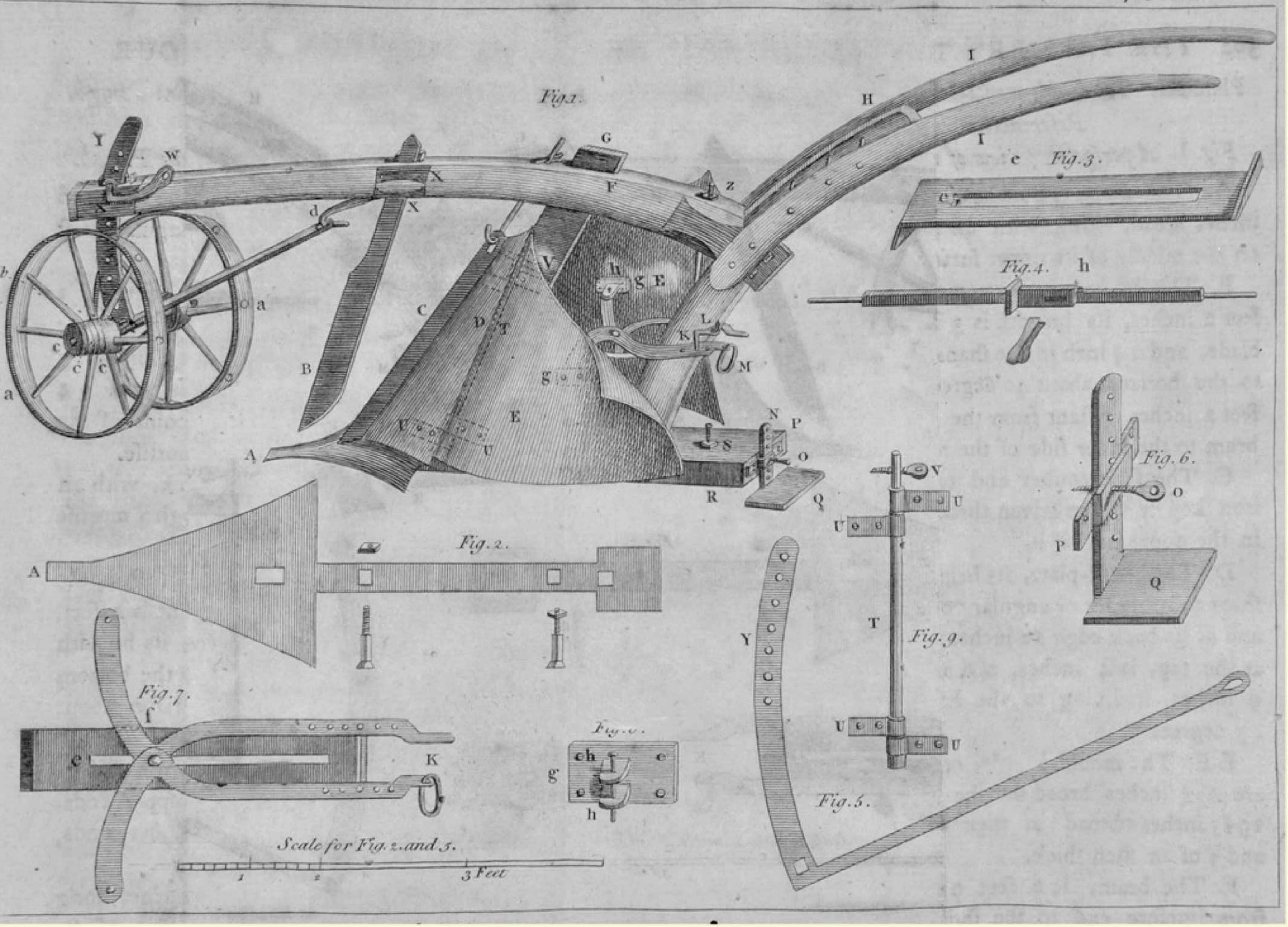
D. The breaſt-plate, its height from the ſhare to its upper or angular point is 2 feet, and at its back edge 18 inches; its breadth at the top, is 4 inches, and at the bottom 9 inches, inclining to the horizon about 45 degrees.

E E. The mould-boards, or iron wings, are 18 ½ inches broad on the upper ends, 19 ½ inches broad at their under ends, and ¼ of an inch thick.

F. The beam, is 6 feet 9 inches long from its fore end to the ſhoulder of its tenon; the thickneſs of the beam is 4 ½

inches

Plate XI. page 502. Vol. II.



inches by 3 ¼ at the ſhoulder of its tenon, which is inſerted into the beam poſt H. The whole length of the plough from the fore end of the beam to the extremity of its handles is 11 feet 2 ½ inches.

G. The ſheath, is 2 feet 4 inches long, 5 ½ broad, and 1 ½ thick; its back edge is 11 ¼ inches from the ſhoulder of the beam, inclining to the horizon 40 degrees.

H. The hind ſheath is 3 feet 2 ½ inches long, 4 ¼ inches broad, and 3 inches thick; its under end is mortiſed into the chip, but the beam and handles are faſtened to the hind ſheath with wooden trundles, wedges, and nails.

I I. The handles of the plough, are 2 feet 8 ½ inches diſtant from each other at their points or upper ends.

K. An iron caliper, whoſe fore ends are faſtened with iron pins (ſee fig. 8) h h, to the inner ſides of the mould-boards or bended iron wings; the outer ends of the caliper are pierced through with holes to receive the hook L, which ſerves to fix the caliper, &c. to the degree of expanſion required.

L. An iron hook faſtened to the hind ſheath H.

M. An iron ring 3 inches diameter, which paſſes looſely through a hole in one of the arms of the caliper, and is laid over the other arm to fix the caliper, when the mouldboards are opened to their full extent.

N. The perpendicular ſhank of the gage plate.

O. A flat headed iron ſcrew, which paſſing through the ſtaple P, and perpendicular ſhank of the hind gage, ſcrews into the end of the chip S, and ſerves occaſionally to elevate or depreſs the gage.

P. A flat ſtaple, which embraces the perpendicular ſhank of the tail gage, and the flat headed ſcrew O, with which the gage is fixed as need requires.

Q. A horizontal iron plate or gage, 5 inches ſquare, and ½ inch thick, with a perpendicular ſhank pierced through with holes to receive the iron ſcrew, with which it is ſet to a proper degree of elevation for the purpoſe intended.

R. The chip, is 3 feet 3 inches long, 5 ¼ broad, and 4 inches thick; the extreme length of the plough from the point of the ſhare A, to the end of the chip R, is 4 feet 4 inches.

S. Two ſcrews and nuts, with which the

ſhank of the ſhare is faſtened to the chip. N. B. Only one of the ſcrews and nuts appear in this view of the plough.

T. A round-headed iron bolt, 16 inches long, $\frac{5}{8}$ of an inch thick, with a hole through its upper end, for a pin or ſcrew to keep it in its place; this bolt paſſes through the eyes of the four iron plates or hinges, U U U U, which are properly fitted and rivetted to the breaſt plate and iron wings or mould-boards, and ſerves as a ſpindle for them to turn on.

U U, &c. Four iron plates or hinges, 3 inches long, 2 $\frac{1}{4}$ broad, and [illegible] of an inch thick, rivetted to the breaſt plate and iron wings.

V. The flat-headed iron pin or ſcrew, which paſſes through the upper end of the bolt or ſpindle, to keep it to its place.

W. An iron hook, faſtened to the upper ſide of the beam, and is occaſionally ſet in the holes of the curved gage, to regulate the depth of the furrow.

X X X. Three clamps or iron plates, faſtened to the beam, to prevent it from ſplitting.

Y. An iron gage or regulator, being a ſegment of a circle, pierced through with holes; this ſegment is about 2 feet 3 inches long (excluſive of its ſhank) two inches broad, and ¼ of an inch thick; its ſhank is 3 feet 2 inches long, and one inch ſquare, with a hole at its extremity for the hook.

Z. A flat-headed iron bolt or brace, which paſſes through the chip, beam, and ſheath; it is faſtened thereto with a nut and ſcrew, to ſtrengthen the plough.

a a. The carriage wheels, are two feet diameter, and two inches on their periphery.

b. An iron axle-tree, 20 ½ inches long, and 1 ⅛ of an inch ſquare in the middle, with a ſmall ſhoulder on each face for the under end of the ſegment to bear againſt, to which it is faſtened with a feathered bolt or wedge through the axle-tree.

c c c. Three wooden waſhers, 4 inches diameter, and one inch thick; the uſe of theſe waſhers is to ſet the carriage wheels at a greater or leſs diſtance from each other, as need requires.

d. An iron hook, which paſſes through a hole in the end of the ſhank of the gage, and ſerves to fix the axle-tree, gage, &c.

to the beam, to which the hook is faſtened with a ſtrong wood ſcrew.

e. An iron plate, 14 inches long, 2½ broad, and ⅜ of an inch thick; this plate is fixed in a horizontal poſition, cloſe under the caliper; its fore end is turned down ſlanting, and faſtened to the ſheath G, and its tail end is turned up ſlanting, and faſtened to the ſheath H. In the middle of the plate there is an aperture 13 inches long; its uſe is to guide the iron pin f, and regulate the motion of the caliper, &c. This plate ſerves alſo as a brace or ſtay to the hind and fore ſheath.

f. A round-headed iron pin, with which the caliper is connected to the directing plate e; the under end of this pin paſſing through the aperture in the plate, is thereby directed ſo as to procure a regular motion to the caliper, mould-boards, &c.

g g. Two iron plates, with two horizontal ears rivetted to each of them. Theſe ears embrace the fore ends of the caliper, and are connected thereto with the iron pin h h. See fig. 8 N. B. The plates are rivetted to the inſide of the iron wings or curved mould-boards; but there is only one of them ſeen in this view of the plough; the other is indicated by the dotted lines on the outſide of the left wing.

h. An iron pin, with which the caliper is connected to the plate, &c. as before mentioned.

A. Fig. 2. The plough ſhare.

e. Fig. 3. The directing iron.

h. Fig. 4. The axis of the carriage wheels.

Y. Fig. 5. The curved gage.

Q. Fig. 6. The hind gage plate; P, the flat ſtaple; O, the flat-headed iron ſcrew.

K. Fig. 7. The caliper; e the directing plate; f the round-headed iron pin, with which the caliper is connected to the directing plate.

g. Fig. 8. A ſquare iron plate with ears, which embrace the fore end of the caliper; h an iron pin, with which the caliper is connected to the ears.

T. Fig. 9. The round-headed iron bolt or ſpindle, which paſſes through the hinges u u, &c. V a flat-headed ſcrew, which ſerves to keep the bolt in its place.

This plough Mr. *Arbuthnot* chiefly uſes for earthing up plants in rows, and ſtriking furrows. It works in light or well tilled land with two horſes, on other occaſions with three. The mould-boards expand at pleaſure, according to the diſtance between the rows, and have ſuch a ſweep, that they will earth up a row of plants to any degree or height required, even to burying them on the top of an arched ridge.

The variations of depth are equally ſimple, being by the ſegment of a circle, which goes vertically through the end of the beam. But as the accuracy of the performance depends on this gage always retaining its exact form, care ſhould be taken in turning on the head-lands, not to throw the plough on one ſide, as practiſed with the common wheel plough.

As I have myſelf uſed this implement, and with uncommon ſucceſs, I beg leave to hint, that in various works I have found it of incomparable uſe: in the operations of horſe hoeing, earthing up the rows, it equals the exacteſt hand work: another uſe, in which it is peculiarly important, is forming ridges out of fine tilled *flat* lands. If furrows are drawn with a ſmall ſwing plough, on a level ſurface at every 4 feet, and the double mould-board goes in them, ridges of that breadth will at once be formed, arched at will by the degree of expanſion in the wings. At 5 or 6 feet the ſame, only at wide diſtances it will not *arch* but leaves a ſmall cavity along the center of the ridge: this is of excellent uſe for cabbages, &c. the ſides to be drawn to the plants by hoeing. I have alſo uſed it for drawing water-furrows on well-ploughed land, and find it executes them extremely well.

After two bout ridges are drawn out in half ploughing, with deſign to finiſh, this plough does double work in finiſhing.

The price 8*l.* 18*s.* 6*d.*

The hint taken from a plough conſtructed by *William Craik*, Eſq. of *Arbigland.*

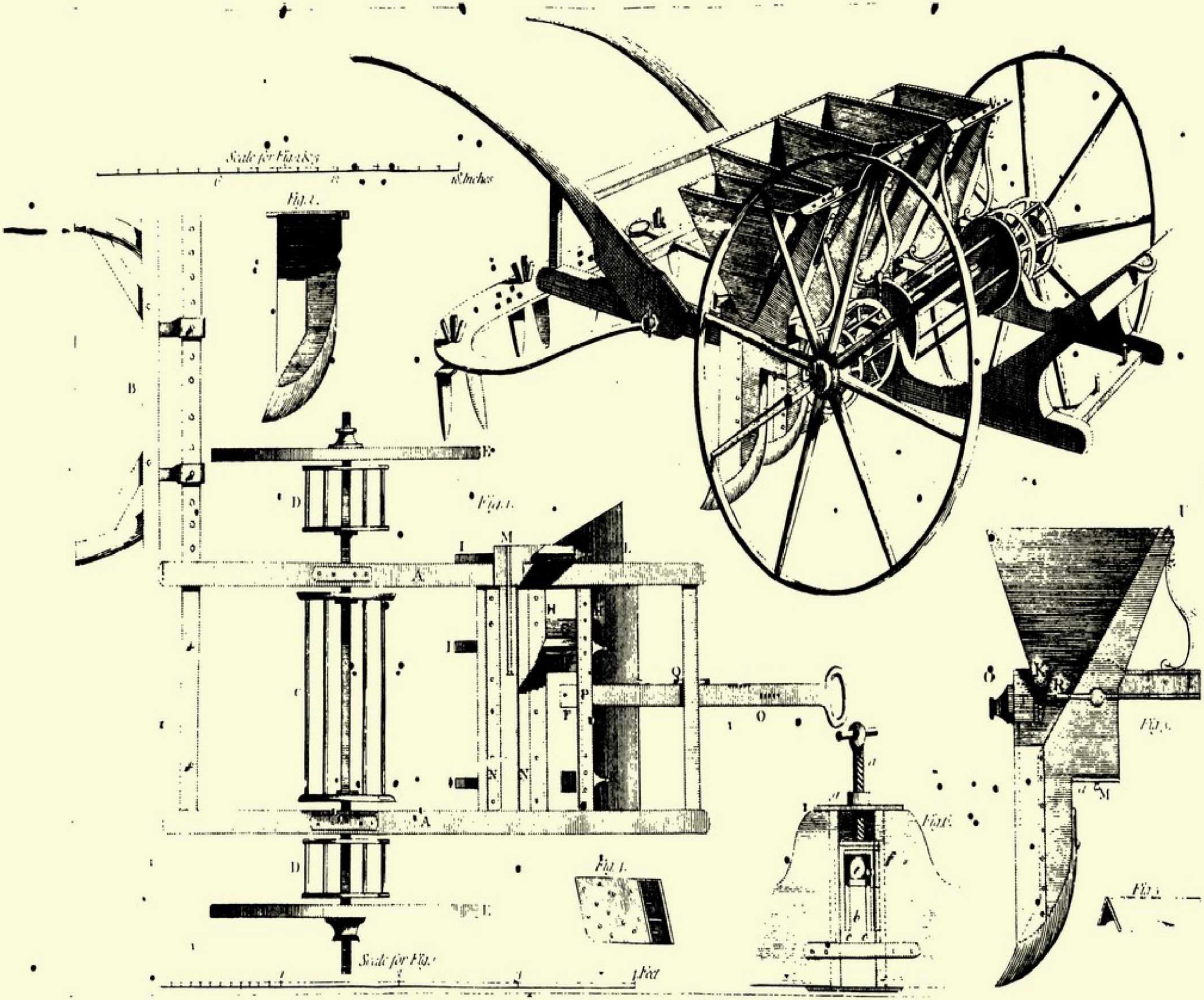
Plate XII. *The Drill Plough.*

References.

A Is the frame of the carriage.

B. The ſhafts, which are movable on a bar, to ſuit different ſized lands, or hang on occaſionally in front, when ſowing flat.

C. The great lanthorn wheel; it is 8 inches in diameter, is immovable on the axis, and has 6 ſtaves.


Scale for Figs. 2 & 3
6
12
18 Inches
Fig. 2.
Fig. 1.
Fig. 4.
Fig. 3.
Scale for Fig. 1
1
2
3
4 Feet
A
B
C
D
E
H
I
K
L
M
N
O
P
Q
R
S
T
U
a
b
c
d
f

D D. Are two of equal diameters, which may be taken off when only two hoppers are wanted; they have likewiſe ſix ſtaves: theſe three wheels turn with the axis, and lift the ends of the levers I.

E E. Are the wheels of the carriage, which go on ſquare on the axis, and may be ſet at any diſtance to ſuit the lands.

F. Is a ſquare plank, two inches thick, which ſlides in the two ſides of the frame; there are two ſeed hoppers fixed on the upper ſide, and on the under are the two ſhares, one in its work marked G, the other repreſented by fig. 2: theſe ſhares ſlide in the plates marked H H, in which there are holes at an inch aſunder for ſcrews, to fix the ſhares at the required diſtance; the openings at the top of the ſhares are bevel, to catch the ſeed, which comes through the ſquare holes in the plank, whichever way you move the ſhare; in the center of the front plate of theſe two ſhares is a hole, and another at half an inch diſtance: theſe correſpond with the ſcrew holes in the plate H, which are an inch aſunder: this anſwers the ſame purpoſe, as if the holes in the plate H were only half an inch aſunder, which would have weakened that plate.

II. Are the levers, which are fixed by a center pin in the hoppers, as repreſented in fig. 3; theſe ends are lifted up by the ſtaves of the lanthorn wheels, which conſequently lower the tongue R, to deliver the ſeed; theſe tongues work againſt a bruſh K, which is ſet at the diſtance ſuitable to the ſize of the grain.

L. Is one of the ſide hoppers, to which the ſhare is fixed, and which has an iron plate M fixed at the bottom, which ſlides in the plates N N. In the plate M, there are three holes, at an inch and a half aſunder, for a ſcrew to fix it at the proper diſtance: thus, when each of the middle ſhares is ſhifted half an inch, the outward ones are ſhifted an inch and half, which keeps them all at equal diſtances.

O. Is an iron bar, fixed into the plank at P; it goes through the end rail of the frame, and ſerves to move the plank with the hopper forward, to ſet it into work, and to draw it out of work at the ends of the lands; the ſix holes are gages to aſcertain the quantity of ſeed to be ſown; a pin is fixed into either of them, which ſtops againſt the rail, when the ſpring Q, on the other ſide of the rail, catches in the correſponding notch; the further the hoppers are advanced to the wheel, the more ſeed is delivered, as the levers I are lifted higher by the ſtaves of the lanthorn wheels.

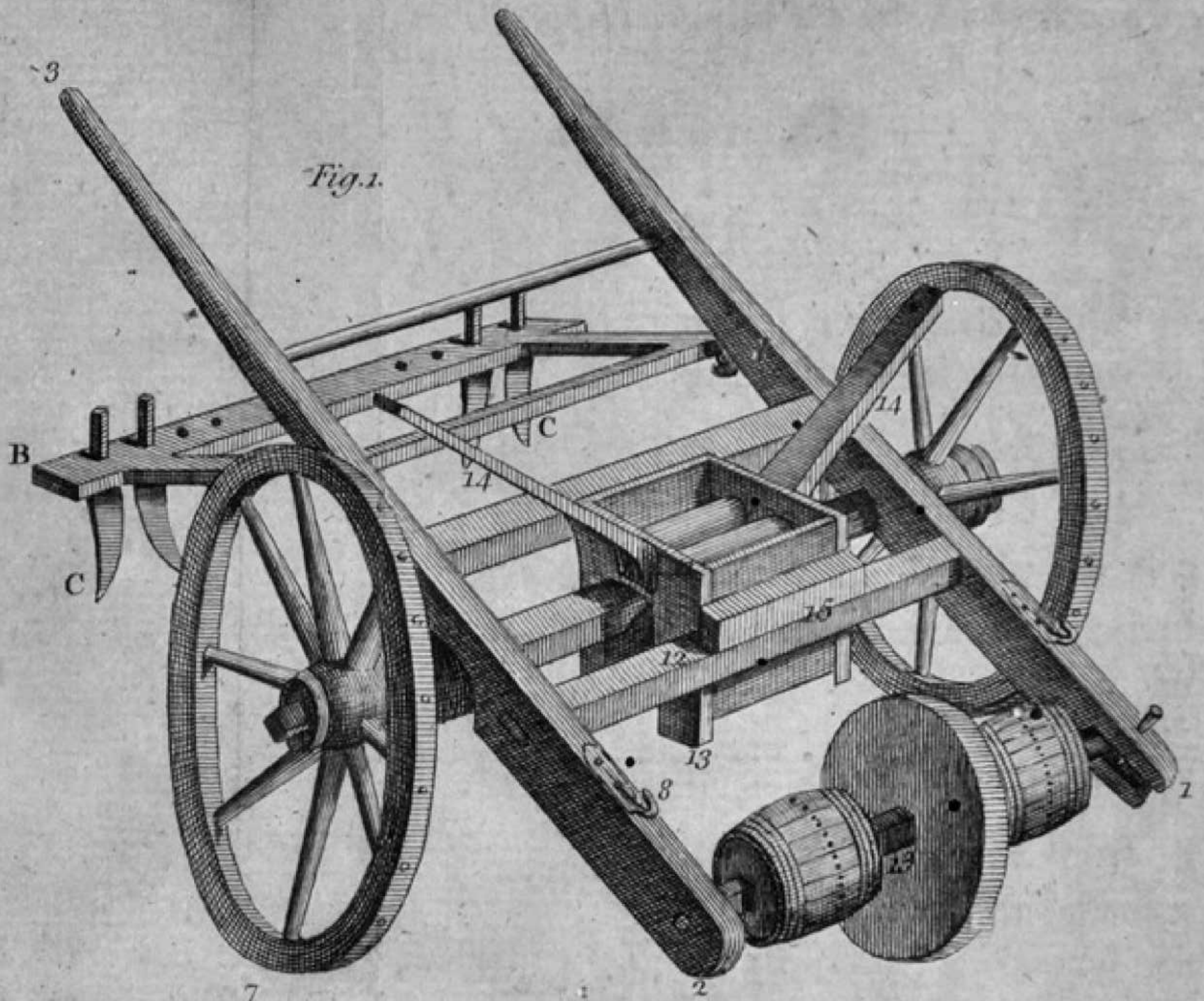
Fig. 3. is one of the outſide hoppers, with the ſhare faſtened to it, all which ſlide together on the plate M. R is the tongue, which lets out the ſeed, when the end I is lifted up, and cloſes the bottom of the hopper, when forced down again by the ſpring S. K is the bruſh, againſt which the tongue works; the elaſticity of the briſtles prevents ſtoppage or bruiſing of the grain; it is ſet by the gage ſcrew T, according to the ſize of the grain. U is a ſcrew, which goes through the iron bar, that ſecures the hoppers at the diſtance they are ſet.

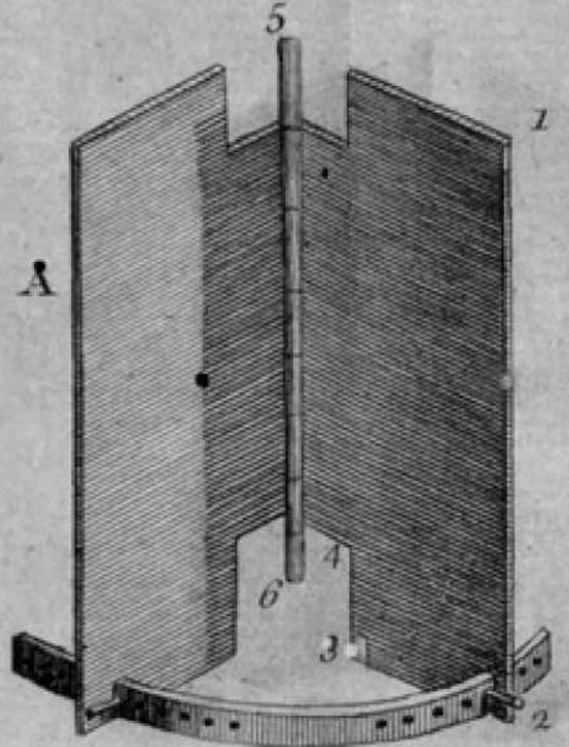
Fig. 4. is an iron box, with wires faſtened in it, which interſect each other; theſe are occaſionally put into the ſhares, when wheat is ſown, to diſperſe the grain, and prevent its falling in lumps.

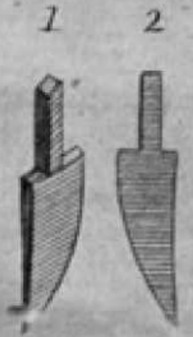
Fig. 5. is a triangular piece of wood, hollow underneath, and on the ſides; it is placed in the hopper, a little above the tongue; this ſuffers the ſeed to ſink gradually, and prevents its laying too heavy, which often makes it arch at the bottom of the hopper; and being hollow at bottom, there is room for the ſeed to riſe by the ſpring of the lever: thus the ſeed is kept in motion, and is delivered more equally.

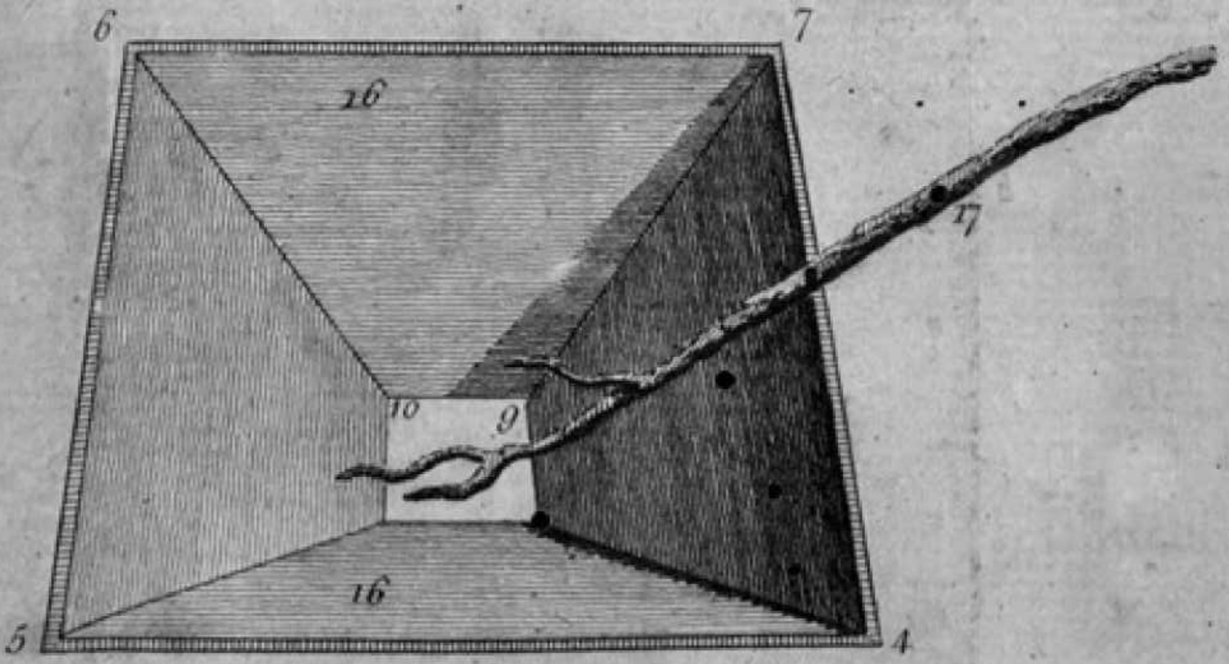
Fig. 6. is a ſliding box, which raiſes or ſinks the wheels to ſow deep or ſhallow. *a* is a ſcrew rivetted at bottom, to the top of the frame *b*, which ſlides up and down in two grooves *c c*. *d* is the axle of the wheel, which runs in the box *e*, and is faſtened in by the pin *f*; this was neceſſary to get the axle into the box, as it is ſhouldered on each ſide, to prevent its ſliding either way: the ſcrew *a* works in the nut *g* to raiſe or ſink the whole.

Vol. II. page. 515. Plate XIII.









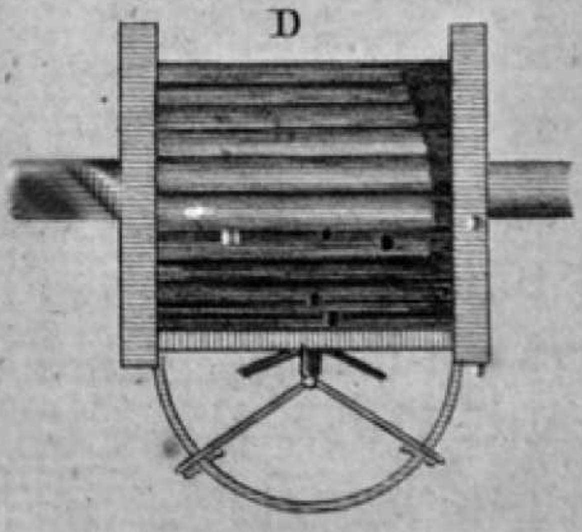


Plate XIII.

The Turnip Drill, with a manure Hopper.

References.

1 to 2 — 2 Feet 6 Inches.
2 to 3 — 6 2
4 to 5 — 2 10
5 to 6 — 2 10
7 to 9 — 1 8
9 to 10 — 0 10½
11 to 12 — 0 4
11 to 13 — 1 0
2 to 8 — 0 11

17 A movable ſtick, with a forked end for ſtirring the manure, in caſe of choaking.

The cags, or little barrels, 9 inches long, and 6 diameter, movable on the axis 13.

The front wheels 15 ½ inches diameter, and 2 inches thick.

The hopper is ſupported by the brace 14 14, and fixed by the peg 16 16.

The wheels 30 inches diameter.

The box 15 is 10 ½ inches ſquare, and contains a fluted roller of wood, 8 inches diameter, turned by the axis of the wheels, and delivers the manure, which would fall perpendicularly, were it not for two ſmall boards, which expand at pleaſure by a hinge, which throws the manure ver the rows. See A.

1 to 2	—	1 Foot	½ Inch.	
2 to 3	—	0	4½	
3 to 4	—	0	3	
5 to 6	—	0	10	This is an iron ſpindle running through the hinge to fix to the bottom of the box 15.

B. Repreſents the harrow, which is hung on behind.

C. The teeth; 1 1 a front view; (2) an oblique view of one.

D. A repreſentation of the roller in profile, and A fixed for uſe.

The great uſe of this implement, which is perhaps one of the moſt ſimple ever invented, is to depoſit the manure directly on the turnip or lucerne ſeed, not by way of enriching the land, but to quicken the growth while young, juſt ſufficient to enable the plant to eſcape the fly. A ſmall quantity laid directly on the ſeed thus, anſwers a very large dreſſing in the common manner. The proper manures are ſoot, malt-duſt, all ſorts of aſhes, lime, dung rotted to powder, pigeon's dung, &c. *

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* The hint of delivering the manure taken from a drill plough invented by Dr. *Gale*, of *New England*, improved only in the variation of the diſtances.

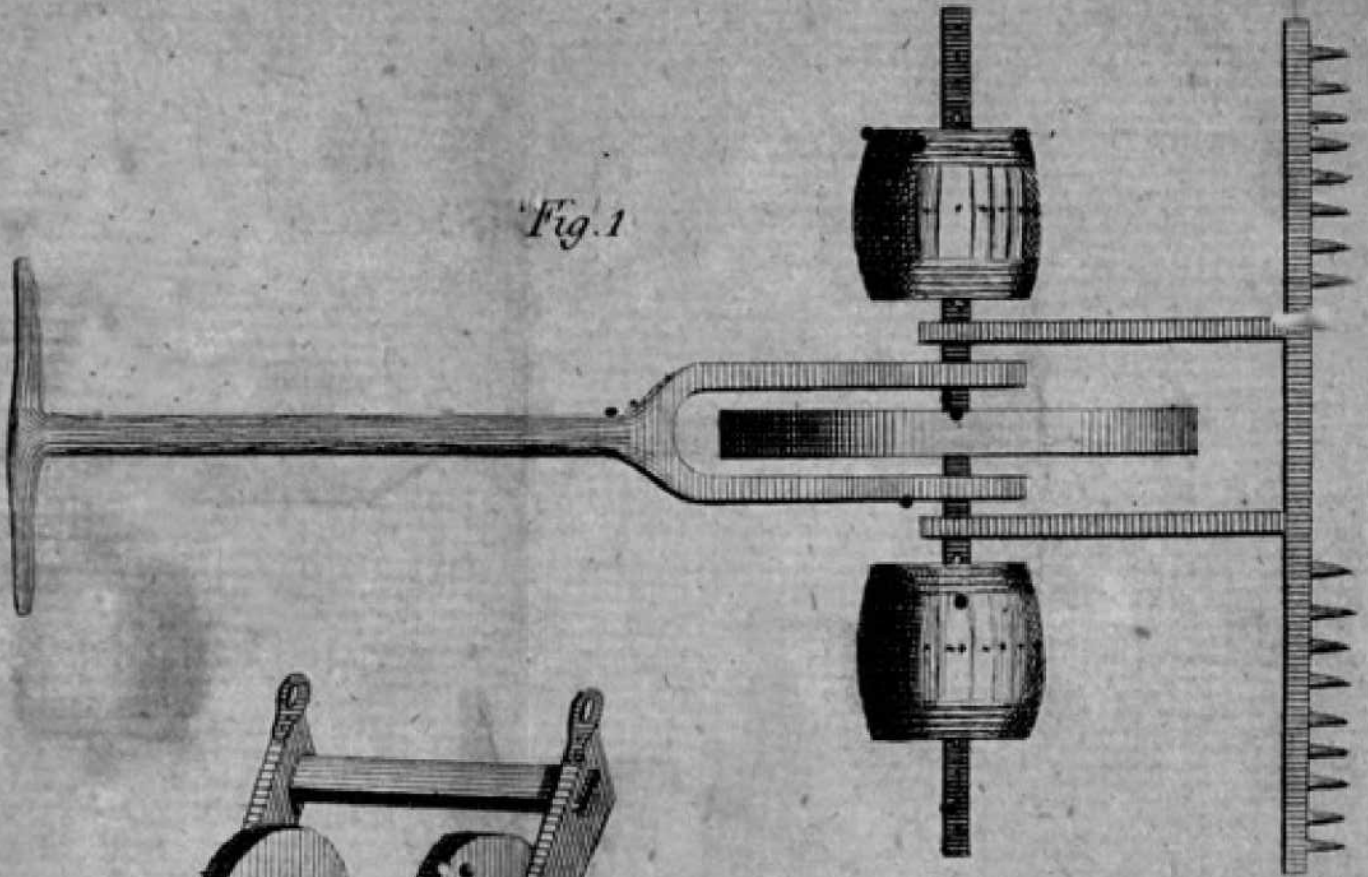


Fig. 1

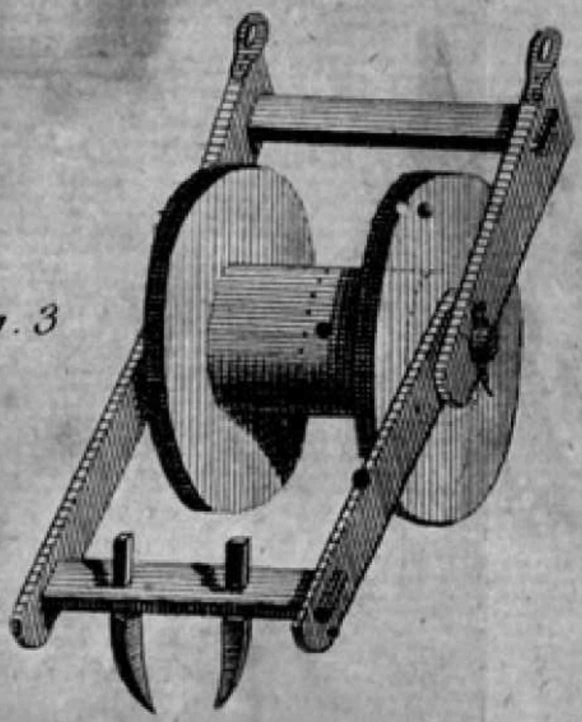


Fig. 3

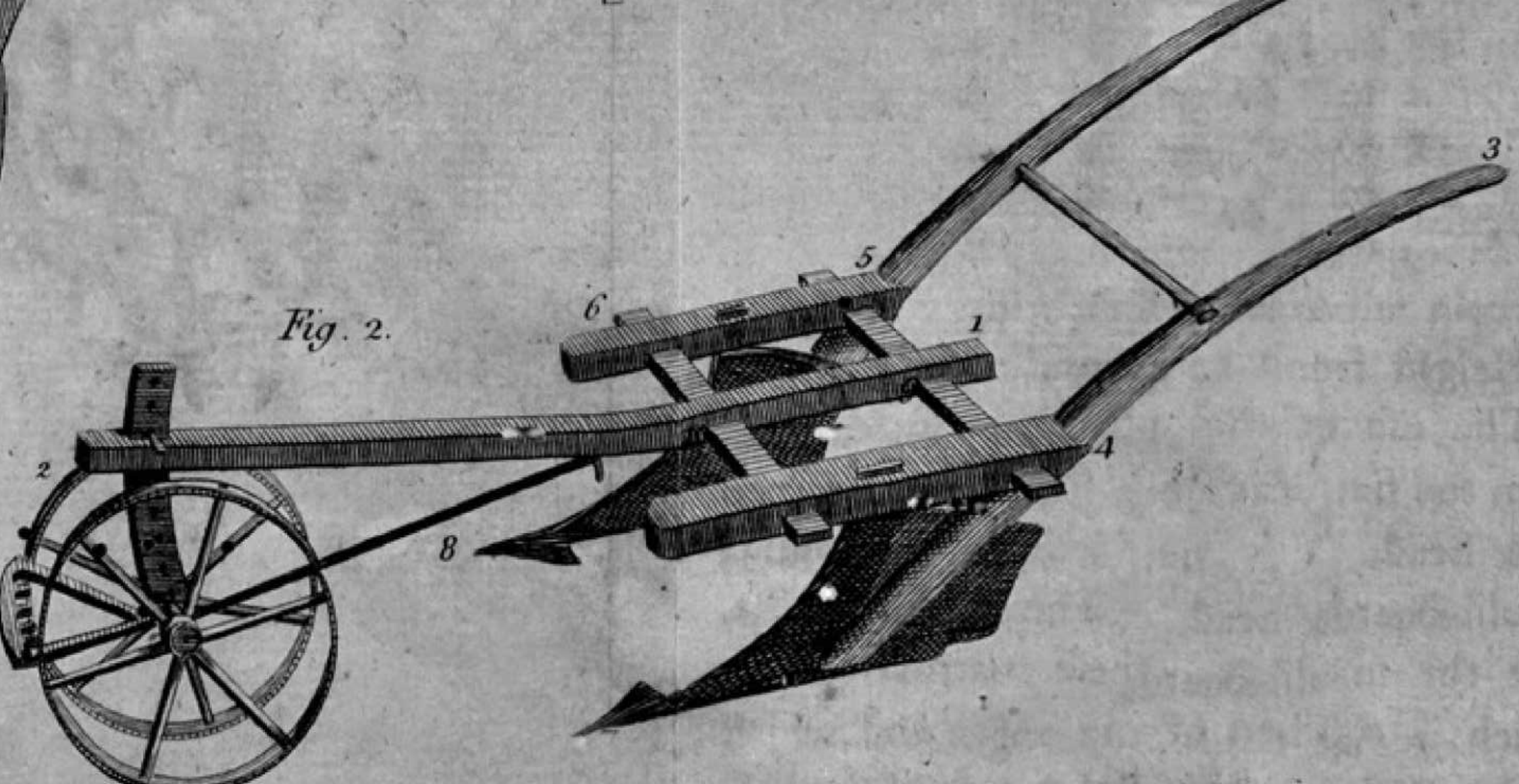


Fig. 2.

In the types fig. 2. Reference 1 to 3 say 1 to 2.

Plate XIV. Fig. 1.

The Turnip Drill.

This tool, which for ſimplicity in the invention has infinite merit, is uſed on land that is worked very fine ready for turnip ſeed, and is drawn by a man or boy along the top of each ridge, or on the flat, at pleaſure. It is unneceſſary to obſerve, that it is cheap, eaſily repaired, or even made by a ploughman, and performs accurately and well.

Plate XIV. Fig. 2. *The Double Plough.*

References.

1	to	3	—	6 Feet	3 Inches.
3	to	4	—	3	8
4	to	5	—	2	0
6	to	2	—	3	2
7	to	8	—	2	2
9	to	10	—	2	2

From tail to tail 1 foot.

Height from the ground 18 inches.

The uſe of this plough is to head up from the flat, leaving a little ſpace between each head, to be divided by the double mould-board plough. The advantage is, that the middle of theſe narrow lands, which is the beſt of the field, and which ought to be in the lighteſt condition, is

L l 3

trampled by the horſes in backing up the firſt furrow in the common method.

Two horſes work it completely, doing double the work of common ploughs.

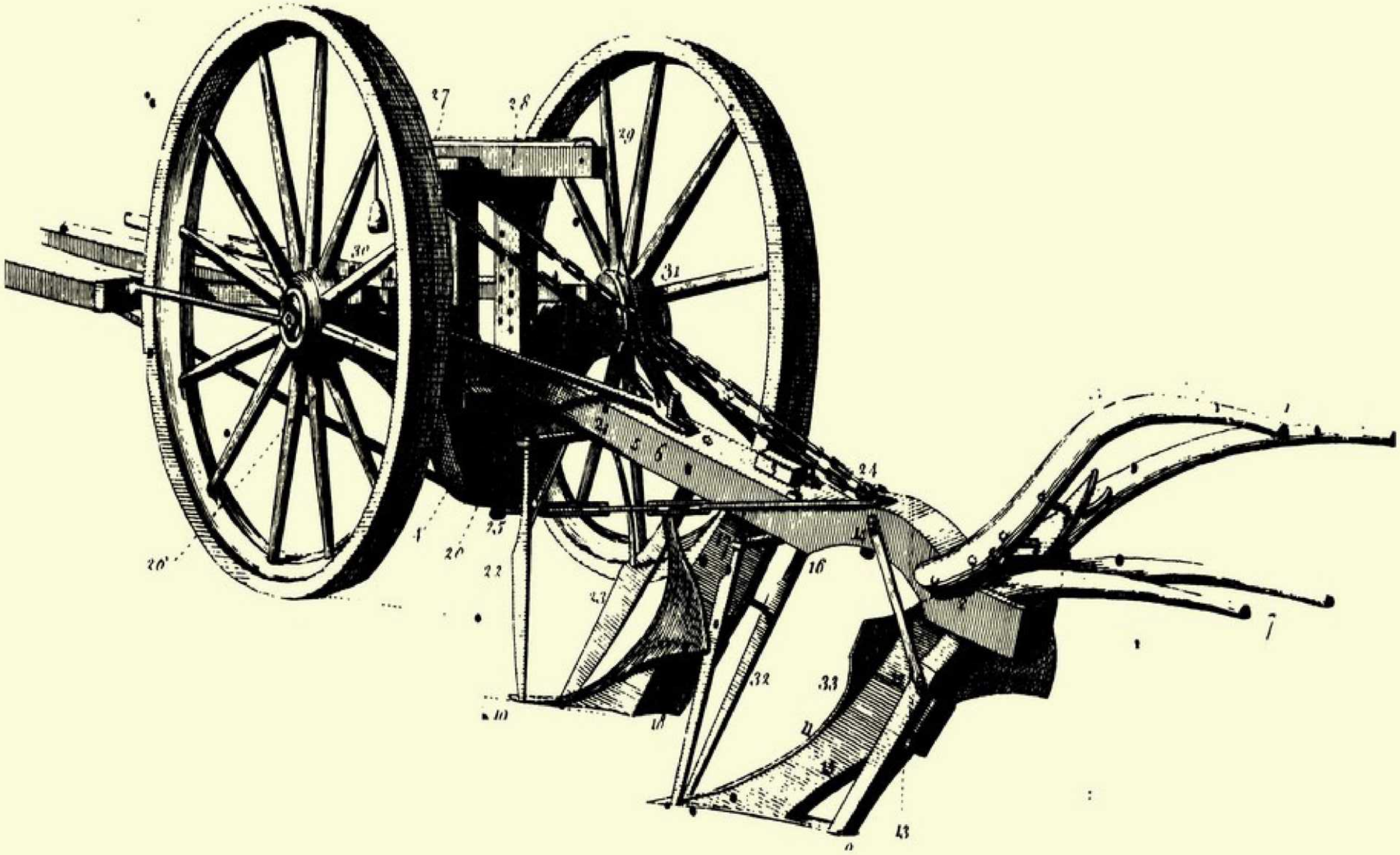
Plate XIV. Fig. III.

A ſmall barrel drill, which fixes to the tail of any plough, and delivers turnip ſeed; the ſimplicity of the conſtruction, its cheapneſs, and other circumſtances render it of more than common value.

Plate XV *The Drain Plough.*

References.

1	to	2	—	5 Feet	0 Inches.
2	to	3	—	2	6
3	to	4	—	4	6
4	to	5	—	2	2
5	to	6	—	0	7
7	to	8	—	2	10
2	to	9	—	2	6
9	to	10	—	2	6
10	to	11	—	1	3
11	to	12	—	1	8
13	to	14	—	1	8
11	to	15	—	0	9
10	to	16	—	2	6
16	to	17	—	1	2
18	to	19	—	1	8
19	to	20	—	1	11
20	to	21	—	1	9
22	to	23	—	1	0
24	to	25	—	5	8



5 to 26	—	2	4
26 to 27	—	1	5
27 to 28	—	1	0
27 to 29	—	3	0
30 to 31	—	3	6
25 to the beam hole bottom		0	6
32 to 33	—	1	7
34 to 35	—	1	4

The lower ſhare 2 ½ inches wide; the upper one 6.

The beam at 24, is 5 inches ſquare; and the ſame, but rounded to 4 inches, at 4.

Standards of the gallows, 6 inches by 3.

Wheels, 5 feet diameter.

This machine cuts the drain 16 inches deep at one ſtroke, on graſs or clover, and requires no cleaning after it, but accidentally; wants no furrows to be drawn out for it to work in; delivers the turf 8 inches thick on one ſide of the trench, and the other 8 inches on the other ſide, which of courſe facilitates the work in covering in: it requires 8 ſtrong horſes, 1 holder, and 2 drivers; leaves the drain cut in a cleaner and more regular manner than poſſible for a ſpade; and if the ground is ſtrong, brings up the bottom of the furrows in as regular a form as if caſt in a mould; and the turf being regularly turned in one piece of equal thickneſs and dimenſions, makes the covering particularly expeditious.

Among other trials of its performance, ſix acres were drained in 3 hours,. 1 ½ rod aſunder, which amounted to 720 rods, or 1920 in the day's work of 8 hours, with 12 horſes; but it is to be obſerved, that by giving wheels of 5 feet, Mr. *Arbuthnot* finds 8 horſes juſt as effectual as the 12. The following ſketch will ſhew the expence.

Twelve horſes and 3 men, according to the price of the country, £.	1	10	0
The proportion of which, in 3 hours, is, -	0	11	3

720 rods, at that price, is not a farthing a rod.

Notwithſtanding which, Mr. *Arbuthnot* thinks this is not a tool to be generally recommended; becauſe it requires an accuracy in the conſtruction, and reparation, if out of order, particularly in fixing the four coulters, not to be expected in the generality of country workmen. That it is alſo expenſive, coming to near 20l.

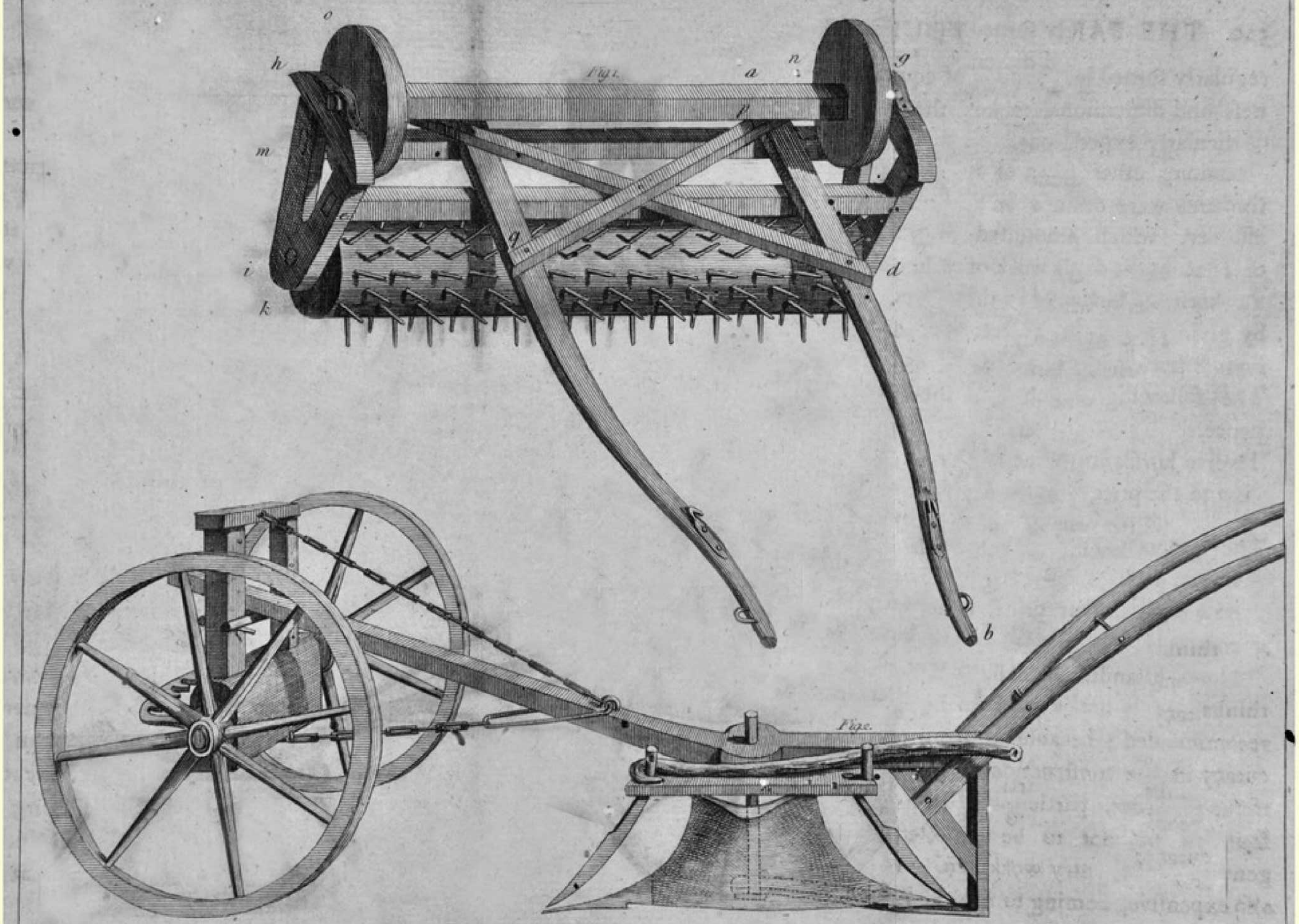

o
h
m
e
i
k
Fig. 1.
a
n
g
f
g
d
c
b
Fig. 2.

Plate XVI Fig. 1

The ſpiky Roller

References

a to b	—	12 Feet	0 Inches.
b to d	—	7	3
g to f	—	3	6
g to e	—	2	0
n to o	—	6	9
h to i	—	2	2
e to m	—	2	4
p to q	—	6	10
b to c	—	2	6

The ſquare of the end braces g, h, 4 inches by 7 ½.

Ditto of the ſtandards e, m, 3 by 7.

Length of the cylinder, 7 feet 6 inches.

The wheel axle, 5 ½ inches ſquare.

Diameter of the cylinder, 18 inches.

Ditto of the wheels, 12 inches.

The ſhafts at q are 3 inches by 5

The croſs bars, 3 ½ inches and 4.

256 Teeth, which weigh 512 *lb.*

However rough a fallow may be, the ſpiky roller will reduce it at twice going; five horſes and one man do 6 acres a day, once in a place; it will be perfectly effectual when harrows or drags have no effect. Clods may be left to roaſt for deſtruction of root weeds, with certainty that they may be at any time reduced to pulverization. The only caution to be obſerved in its uſe is, that it muſt never go on the ground till perfectly dry. Mr *Arbuthnot* under that circumſtance never knew an inſtance of any mould adhering to it, but on the contrary, when by chance it has been carried on too ſoon, it immediately clogs.

Plate XVI. Fig. 2.

The Turnwreſt Plough.

This is an idea of Mr. *Arbuthnot*'s: it has not yet been executed, but he intends it as ſoon as his numerous avocations will allow him time. His objection to all the common turnwreſts is the neceſſity there is of the ſhare being ſo narrow that it cannot cut the furrow; and the impoſſibility of fixing a proper mould-board; both which objections will be here obviated.

This gentleman having, as the reader may judge from the preceding implements, given uncommon attention to the conſtruction of all ſorts of ploughs, I was very deſirous of having him lay down explicit rules for the inſtruction of wheel-wrights in building a common plough; on requeſting him to explain his ideas on this ſubject, he was obliging enough to draw up the following paper, accompanied with ſeveral very accurate drawings: I inſert it here with the utmoſt ſatisfaction, under the firm conviction, that ſo clear and deciſive an account of the principles of conſtructing a plough never yet was laid before the publick.

As different counties have adopted ploughs of different conſtructions, ſeemingly more from chance, than the expediency of ſoil, or other circumſtances, I ſhall in the following eſſay endeavour to explain the principles on which the ſwing and wheel-ploughs ſhould be conſtructed to the greateſt advantage, and ſhew, wherein the management of the one eſſentially differs from the other.

Secondly, I ſhall attempt to prove in which part of the plough the point of reſiſtance is, from which the different lines of traction muſt tend to the horſes ſhoulders, in different operations, and ſoils; and by explaining, wherein the direction of the line of draught to the wheel-plough differs from that of the ſwing-plough, prove the ſuperior advantage of the wheel-plough, where the nature of the ſoil will admit the uſe of it.

Thirdly, I ſhall deſcribe the form of the ſhare and ſweep of the breaſt and mould-board, which have appeared to me moſt likely to diminiſh the friction and adheſion of the earth on this uſeful but as yet imperfect machine.

Laſtly, I ſhall attempt to give an eaſy mechanical rule to wheelwrights, by which they may lay down a plan for any form of a plough, which their moſt inferior workmen may execute, and which will likewiſe enable them to preſerve the form and proportions of any plough they are ordered to copy, though the plough ſhould be required to be of different dimenſions.

I ſhall only further obſerve, that what I ſhall advance, is founded on experiments proſecuted with the greateſt attention.

I ſhall begin with the ſwing-plough, which is poiſed by two levers; the one of which is the handle, and acts as a lever of the firſt kind, the fulcrum being at the heel of the plough, between the power at the handles, and the weight on the ſhare. The other lever is the beam, which is of the ſecond kind; the end of the beam being the point where the power is applied, the weight being on the ſhare, and the heel of the plough the fulcrum. When theſe powers are properly applied, the ſwing-plough is a very good inſtrument; and in the hands of ploughmen, who are uſed to obſerve the proper æquilibrium, will perform its work to any reaſonable depth.

As in the circumſtance of the weight being on the ſhare, I differ in opinion from a very ingenious author, the Rev. Mr. *Dickſon*, it is neceſſary I ſhould give my reaſons, and the proofs whereon they are founded, more eſpecially as the length of the beam and handles, and application of the drought, entirely depend on this propoſition, as will appear hereafter fully explained, in aſcertaining the line of traction.

I do not pretend to ſay, that the natural center of gravity of the plough is on the ſhare; but when I conſider the additional weight of the part of the furrow to be lifted, though ſeparately the center of gravity of each is in a different point, yet when they become one body, they muſt have a common center of gravity, which in my opinion, muſt be in a perpendicular line, nearer the point of the ſhare, than when the plough was a body by itſelf.

And when I further conſider, that the power of coheſion in the body to be lifted is much greater than its gravity, and that the ſeparation of ſuch body is firſt to be effected by the point of the ſhare; and further, that the reſiſtance of the earth againſt the coulter, which is very conſiderable, is above the point of the ſhare; I cannot but believe, that, in proportion to the ſolidity of the body to be ſeparated, the weight and reſiſtance is advanced nearly towards, if not quite to that point. This ſeems to be confirmed by practice; for, when ploughing in loam, if the point of the ſhare touches on clay, the plough will immediately ſuck into the ground, and ſometimes require the whole weight of the ploughman on the handles to priſe it up. But to ſatisfy myſelf as to the fact, I have often (when my plough has been working to my mind) ſtopped the horſes ſuddenly, and then fixing a ſtick in the ground, to the height of the tug at the horſe's ſhoulder, and removing the earth from above the ſhare, without altering the poſition of the plough, I always found, that a line extended from the top of the ſtick to the point of the ſhare, interſected the notch of the copſe to which the draught was fixed.

But as the ſtooping of the horſe, when at his pull, will lower thoſe ends of the draught chains, and the other ends being fixed to the beam will carry the direction of the line of traction a little backward, I will not contend, that the draught is immediately from the point of the ſhare, but from a point an inch or two behind it: however, from the above mentioned experiment, I ſhould be induced to call that point, the center of reſiſtance, nor do I conceive that the center of gravity of a plough can be in any point of the line of traction, though I believe in the combined weights of the plough and earth, their common center of gravity is near it, at leaſt on ſome part of the ſhare; for as that part of the furrow, which is ſupported on the mould-board, is on a much more inclined ſurface, than that part of the furrow, which reſts on the more horizontal ſurface of the ſhare, their centers of gravity diſtinctly muſt fall in different lines, and indeed the lateral ſurface of the board riſes ſo ſuddenly, that the center of gravity of that part of the mould muſt ſoon be out of a line with the plough, conſequently the medium of the weight of earth, is probably pretty forward on the ſhare; but as I mentioned before, the power of coheſion being greater than the weight, in my opinion puts it beyond a doubt.

That the length of the handle, which is the long arm of the bended lever, ſhould be to the length of the bottom of the plough, which is the ſhort arm, as the weight on the ſhare, and tendency of the point into the ground, are to the power, which is applied at the handle, is ſelf-evident, and it is made ſo by moſt wheelwrights. But I cannot ſay, that the other part of the plough, which conſtitutes the lever of the ſecond kind, has been ſo well conſidered and attended to, though it is by far the moſt eſſential: firſt, as the application of it is not ſolely to the ſtrongeſt power of the horſe, which is that of drawing, but partly to his power of lifting. For when the line of draught is nearly parallel to the plane whereon the horſe goes, he will draw a much greater proportion of his weight, than he can carry. Hence it appears, that the proper length of this lever requires the greateſt attention; but the other, provided it is long enough, cannot be amiſs, as the whole weight of the ploughman is the required power at the utmoſt.

The only rule I have been able to lay down, is, that a line drawn from the tug at the horſe's ſhoulder to the point of the ſhare, ſhould interſect the notch in the copſe immediately below the end of the beam, as that pitch admits of the moſt variations; it muſt be obſerved, that the tug at the ſhoulder of a full-ſized horſe is about four feet four inches from the ground, and the length of chains neceſſary for him to work freely about nine feet; but, as I ſaid before, when the horſe ſinks to his pull, I think it muſt neceſſarily carry the line of traction to a point behind the point of the ſhare; but it is ſcarcely poſſible to aſcertain the immediate ſpot on the ſhare, from the difficulty of meaſuring the height of the tug at the horſe's ſhoulder, when he is in motion. However it is ſelf-evident, that in proportion to the ſinking of the horſe, as the draught chains are fixed to an inflexible beam, the direction of the line of traction will be carried backward; but, as the center of reſiſtance can lay but in one point, the ploughman will immediately be ſenſible of the alteration, and if only an accidental ſinking of the horſe, will remedy it by preſſing on the handles; if the natural diſpoſition of the horſe is to ſink to the draught, he will alter the direction of the line of traction, by lowering the draught at the end of the beam.

I have given the above direction to my wheelwrights, and they find it anſwers; but, as the different heights of horſes, and the different applications of the draught, being ſingle or double, will make a great alteration in he line of traction; that is, when one horſe goes on the land, and the other in the furrow, the line of traction will be as if both horſes were on a ſurface half the depth of the furrow; and when the horſes go at length, viz. one before the other, the angle of traction of the foremoſt horſe with the ground will be more acute than the angle of traction from the hindmoſt or thill horſe; therefore an intermediate angle muſt be found. And further, as the different nature of ſoils, in which the plough works, will make an alteration in the above rule, it is neceſſary to fix a copſe at the end of the beam to raiſe or lower the draught, and give the plough land or not: the uſe of which is ſo well underſtood, that a deſcription of it would be needleſs, was it not in the firſt place to prove, how much the cat-head uſed in *Suffolk* is ſuperior to every other kind of copſe; and in the ſecond place, to point out the error of many ploughmen in their application of the draught, when horſes go at length. Fig. 1, plate XVII. is the cat-head, with the copſe fixed to it. Fig. 2, is the ſide view of the copſe belonging to the cat-head. Fig. 3, is the common copſe. Fig. 4, is a copſe uſed in ſome parts of *Yorkſhire*. Plate XVIII. fig. 1, is a plough in its work, with the different lines of traction neceſſary to be obſerved in the application of the draught, which ſhews the neceſſity of aſcertaining the point of reſiſtance, as on that depends the poſition of the beam. A B is the beam of the plough, ſix feet long, having a copſe extending three inches beyond it, and eight inches deep. The under part of the end of the beam at B, 14 inches from the bottom of the

furrow.

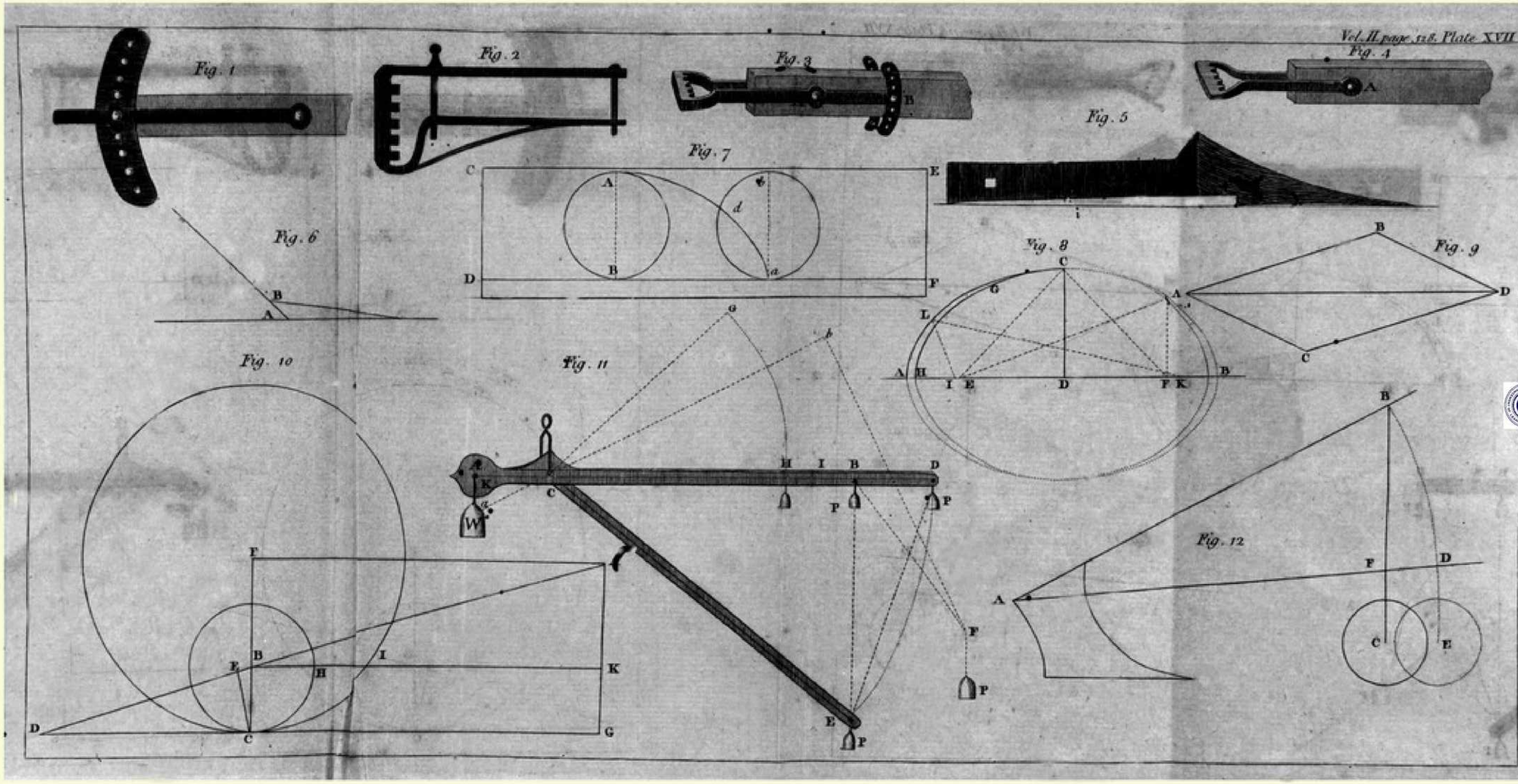


Fig. 1
Fig. 2
Fig. 3
B
Fig. 4
A
Fig. 5
Fig. 6
B
A
Fig. 7
C
A
B
D
b
d
a
E
F
Fig. 8
C
G
L
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H
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E
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F
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B
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Fig. 9
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Fig. 10
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Fig. 12
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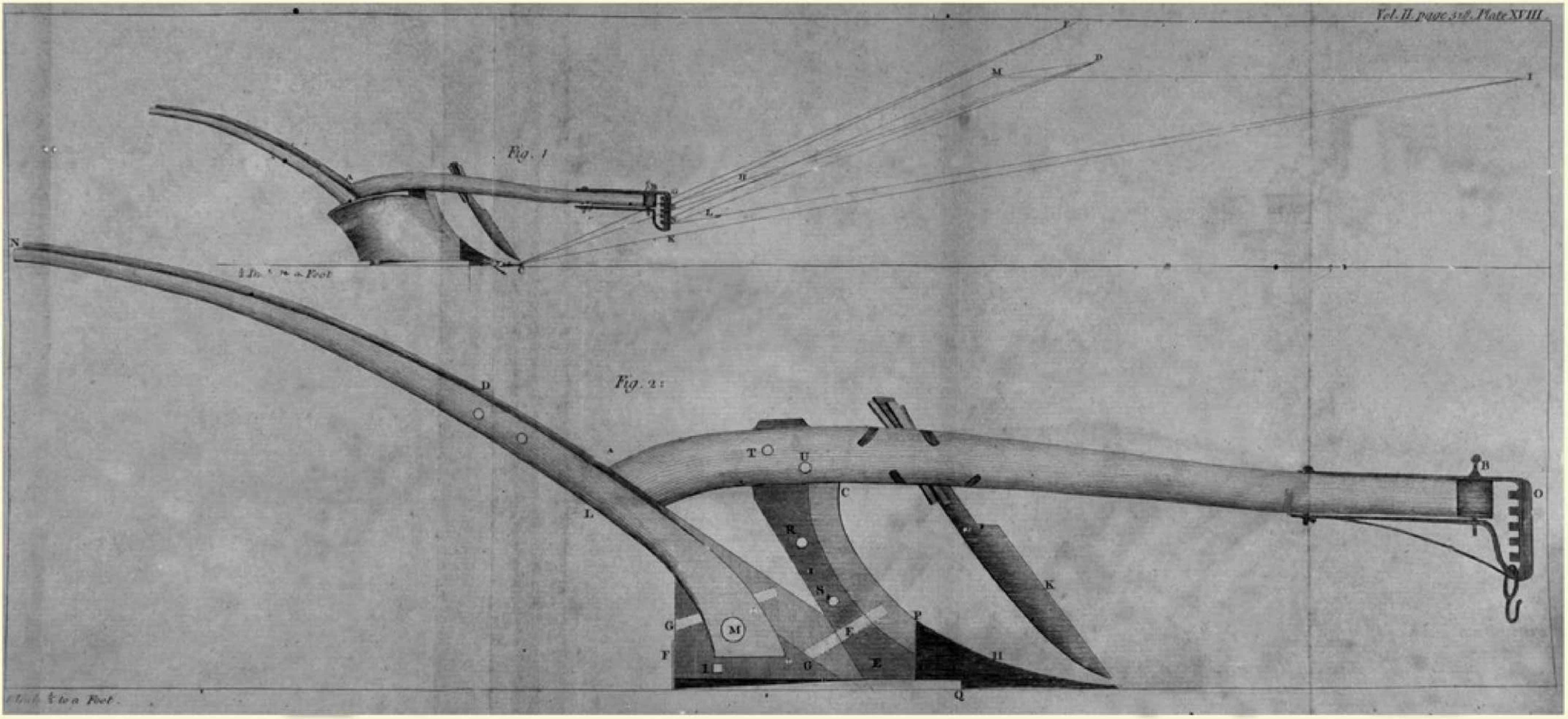


Fig. 1
A
B
C
D
F
I
L
M
N
O
K
½ In. to a Foot
Fig. 2:
N
D
L
A
T
U
C
R
S
F
G
M
F
I
G
E
P
H
K
Q
B
O
Inch ½ to a Foot.

furrow. C the point of the ſhare, 2 feet 10 inches diſtant from the under part of the end of the beam at B. D is the point of the horſe's ſhoulder, about four feet four inches high; the diſtance from that point to the end of the beam, for a full-ſized horſe, will be about nine feet; if the horſe ſtands in the furrow, the line of traction, C D, will interſect the copſe at the notch E, about two inches below the end of the beam; but if the horſe ſtands on the land, his ſhoulder will be at F, and the line C F will interſect at G. Thus, when horſes go abreaſt, the draft muſt be fixed between E G at H; but, if the horſes go one before the other, the line of traction, from the foremoſt horſe's ſhoulder at I, (which will be full eight feet ſix inches beyond the tug of the thill-horſe) will cut below the copſe at K; conſequently the lines of traction D C and I C muſt be united in one draught at L, bringing the chains from the foremoſt horſe to the whipping at L, the ſame as from D. This is undoubtedly the method in which the draught ought to be applied: but the uſual cuſtom is to raiſe the chains of the thill-horſe up to M, level with his ſhoulder, and often higher, by ſhortening the ridger, which is a ſhort chain that goes over the horſe's back; the only uſe of which ought to be, to ſupport the chains from hanging ſo low, as that the horſe may get his legs over them; but they ſhorten it to raiſe the beam of the plough, making the angle D M C, and letting the foremoſt horſe draw from the chains of the thill-horſe, in the line I M; without conſidering, as I ſaid before, that it is not only applying the power to the weakeſt part of the horſe, but alſo that, by making an angle in the line of traction, the weight on the thill-horſe's back is increaſed, in proportion to the draught of the horſes that are before him. By this method it is evident, that the whole weight of the draft of the plough is ſupported by the thill-horſe; and though a horſe cannot continue to work under above one third of his weight, he is often obliged to ſupport the weight of the draft of four ſtrong horſes, each of which can draw more than one third of his weight: the conſequence is, that the thill-horſes never put their ſhoulders to the collar, learning by habit, that their ſhare of the labour is to carry the weight, and that ſometimes ſo intolerable a one, that you will ſee them reel in the furrow. I have dwelled longer on this ſubject, to convince gentlemen, who engage in farming, how neceſſary it is that they attend to the mechanical minutiæ of their inſtruments and labour. Having explained the neceſſity of making the alterations of the draught at the copſe, the cat-head above deſcribed will appear much more uſeful than the common one. See fig. 3, plate XVII. which moves upon a center pin at A, and is fixed to its pitch by the movable pin B, which requiring to be keyed in, that the pin may not be loſt, it is ſo much trouble to the ploughman to make any alteration, that he always is careful to give the plough too much depth, at the ſame time ſhortening the ridger, in the manner explained above, fixing the draught as low as the notch at N, plate XIII. By this means, one power counteracts the other, at the expence of an additional horſe, almoſt uſeleſs in the team; the only alteration the ploughman makes, as to the depth, is by taking up or letting out a link in the ridger. Bad as this copſe is, it is ſtill preferable to the *Yorkſhire* one, (ſee fig. 4, plate XVII.) which ſwings up and down upon the fixed pin A, not admitting of any alteration as to depth; therefore anſwers no better purpoſe than if the chains were faſtened to the beam at A. As to the method of notching the plough in or out of land, the one anſwers the purpoſe as well as the other.

As the perfection of the ſwing plough depends on ſo great a nicety, it is continually liable to be out of order. For example, if the point of the ſhare be made longer or ſhorter by new laying, or is ſet down either too deep, or not deep enough, the plough will not go well. This indeed a ſkilful ploughman will in ſome degree rectify, by an alteration in the geers. The beſt method is, as I have ſaid before, by raiſing or lowering the draught at the copſe; but if it requires ſo much alteration, that the depth of the copſe will not admit of it, the next beſt is by lengthening or ſhortening the traces; which will alter the angle of traction; and this ſhews, that the length of the traces ſhould be more attended to than I believe it generally is. When a plough is well pitched, the ſhorter the traces the better, ſo as that the horſe can but work. If the traces will not admit of being ſhortened, the only method left is to ſhorten the ridger; but this is ſo very improper, that it is abſolutely neceſſary, that the plough irons ſhould be kept in ſuch order, as never to require this laſt operation. The method I take to prevent my ſhare being altered from the firſt form, when ſent to be new laid by the ſmith, is, that the land ſide of the ſhare is continued the whole length of the bottom of the plough, and when applied to the pattern I have given him to work by, he has the complete form of the bottom of the plough,

and

and can make no alteration, unleſs wilfully; neither can the ploughman ſet the point up or down, or in or out of land, the whole going on at once, and fixed by a bolt at the heel. See fig. 5, plate XVII.

The next part to be conſidered is the mould-board, about which people differ much in opinion, as to the ſhape of the breaſt, and ſweep of the board. I have paid great attention to theſe, and do confeſs each has its peculiar merit, in the hands of different ploughmen, in particular operations. I prefer the curved board, as being moſt generally uſeful. The one moſt common in uſe is the ſtraight board, with the breaſt ſtraight and ſharp, making an angle, fig. 6, plate XVII, A, of about 53 degrees with the bottom of the plough; and another, B, of 137 with the upper plane of the ſhare on the land ſide. This laſt angle is evidently a fault in the plough, as appears by its being filled up with earth by the time it has gone through a few furrows; which filling up proves the form it ought to be of, namely, that this angle ought to be filled up with wood or iron, as the friction or ſtickage of the earth on ſuch ſmooth ſurface will be much leſs than on the earth, which has filled up the cavity.

Another evident fault in the ſtraight mould-board is pointed out by the earth's wearing a hollow in the breaſt, nearly ſimilar to the ſweep of the *Rotheram* board. This ſhews that *that* part is as much too full, as the bottom of the breaſt at the ſetting on of the ſhare, is too hollow. Indeed, I do not know a better practical rule to finiſh the ſweep of a board, than by working the plough ſome days before it is plated, as the earth will wear off thoſe parts that project too much, and fill up the hollows that ought not to be: which laſt circumſtance ſhould be attended to in plating the mould-board: not but that in ſome inſtances the wooden mould-board is preferable to the plated one, particularly when working in ſtrong land, when there is too much moiſture in it, which muſt ſometimes be the caſe in ſeed time, as at that ſeaſon farmers cannot command their time as in breaking up or fallowing. The reaſon I take to be this, that the wood imbibes a due quantity of water; thus the ſurface of the wood being always wet, the ſtickage or adheſion of the earth is not ſo great as on the iron, which cannot admit the water; but the wooden mould-board wears out ſo ſoon, and the expence of the curved board is ſo great, that the inconvenience attending the iron plate muſt be diſpenſed with.

A further great objection to the ſtraight board is, that it is neceſſarily too wide at heel, and conſequently acts like a continued wedge. I mean the common *Engliſh* plough with the ſtraight mould-board; the *Scotch* one deſcribed by Mr. *Dickſon*, is evidently better, as it has the wreſt raiſed ſo as to make an angle with the plane of the horizon, from the buck of the ſhare to the heel: whereas the *Engliſh* wreſt is parallel to the plane. To remedy the inconvenience that ariſes from this form in the *Engliſh* plough, they hold it over on the land-ſide; otherwiſe, in ſtrong work, they could not get it through the ground. This ſubjects them to wreſt-baulk the land, which is acknowledged to be a very great fault in ploughing, as part of the under ſurface of the land is not moved. But an intelligent ploughman will rectify this, by ſetting down the fin of his ſhare. However, this depends on his care, occaſions loſs of time, and is attended with expence in altering the irons.

Another inconvenience attending this method of holding the plough on the land-ſide is the increaſe of friction, by ſo much as the quantity of earth always ſliding on the board is greater. The only advantage it ſeems to have beyond that of the curved-board is, that, by holding it on the land-ſide, when ſtriking up the laſt furrow, it will have more hold of the ground therefore not ſo liable to ſtrike at heel: by this means it will throw up a furrow, that the *Rotheram* will not do, when held in that direction; as the breaſt of the left, which is hollowed out, then becomes a more horizontal ſurface, and carries the furrow; which ſhews, that the *Rotheram* ſhould always be held upright, and it will then perform this laſt operation quite as well as the other, provided the crumb-furrow is taken cloſe to the adjoining land. On the whole, in my opinion, there are many diſadvantages, and not one real advantage, attending the ſtraight board. In this, I have not only my own practice to confirm me in my opinion, but alſo that of ſome neighbouring farmers, who frequently borrow my ploughs to break up ground, which they cannot do with their own. This laſt circumſtance is no ſmall proof of the preference of the curved mould-board.

My plough differs ſome little matter from the *Rotheram*, though I took ſome hints from it: for as it was obvious that the angle at the ſetting-on of the ſhare was a fault, I preferred it to the *Suffolk*; which otherwiſe is a good little plough in light land, but has not length enough to go ſteady in our ſtrong land. The weight on the ſhare being ſo near the fulcrum at the heel, the leaſt preſſure on the handles or jerk of the horſe will raiſe it.

From the ſhape of the *Rotheram*, I was led to believe, that the ſegment of a circle muſt be the true ſhape. But I found it neceſſary to take the ſegment of a large circle, in order to obtain an eaſy admiſſion into the ground: but this carried the mould too high on the breaſt. It then occurred to me, that a ſemi-cycloid was the proper ſhape; the bottom of which, being ſo much leſs ſteep than that of a circular-arc, will enter more eaſily and freely into the ground. As this kind of wedge moves the earth only on one ſide, it will act on the body of earth lifted, in proportion of its length to its thickneſs; and the upper part, being ſo much ſteeper, will turn off the mould ſo much ſooner than the laſt-mentioned ſegment, but not ſo ſuddenly as the plough in general uſe, and therefore will raiſe the furrow ſo much eaſier as the turning it off is ſlower. I made one of the ſize of the *Rotheram:* the ſweep of the breaſt was deſcribed by a generating circle of ſixteen inches diameter; it performed the work much better than any plough I had ever ſeen; but trying it in very looſe mould, I perceived ſome earth would now and then lodge in the throat: this induced me to make another, the ſweep of which was the half of a ſemi-ellipſis, whoſe ſemi-conjugate diameter was likewiſe ſixteen inches: thus the pitch of both was exactly the ſame. In the laſt mentioned circumſtance; this ſeemed to have the preference; but as each of them have their peculiar properties, and both of them are preferable to any plough I have yet ſeen, I ſhall give a deſcription of each, obſerving, that if either of them is approved, it will have the advantage of being deſcribed by a certain rule to wheelwrights, which is not the caſe with any others, and is the reaſon that they ſeldom make two ploughs that go alike. The firſt is the ſemi-cycloid, ſee fig. 7, plate XVII. Let C E F D be a flat board, having a ledge D F fitted to the bottom; apply the wheel A B on the board to the ledge, and having fixed a pin to the edge of the wheel at the point A, move the wheel from B towards F, till it is turned half round, and then A will be at a, and the pin will have deſcribed the ſemi-cycloid or propoſed figure A D a; which being turned upſide-down will be the true form of my plough from the point of the ſhare to the throat.

The other is the half of a ſemi-ellipſis, of which the ſemi-conjugate diameter is ſixteen inches, and the diſtances of the focus's from the common center likewiſe ſixteen inches; thus the figure is deſcribed by a right-angled triangle, whoſe baſe is 32 inches; but as ſome wheel-wrights may not be acquainted with the mechanical method of deſcribing this figure, I ſhall explain it in fig. 8, plate XVII. Upon the indefinite right line A B, raiſe a perpendicular C D, and from the point D mark off with the compaſſes ſixteen inches at E, C, and F, at which points ſtick in three pins and tye a ſtring round them; then remove the pin at C, fix the point of the compaſſes into the ſtring, and deſcribe the figure C G H round the two centers E F: the one fourth part of the figure C G H turned upſide-down is what is required. The lower part of this has as gentle an aſcent as the other, and therefore enters the ground as eaſily, and by riſing more ſuddenly above the ſhare it forms a ſharper breaſt, and by that means prevents any looſe mould hanging in the throat, which undoubtedly is an advantage, eſpecially when the ground is between wet and dry. But in lay ground, which is to be ploughed up for ſowing, I ſhould prefer the other, as it will not be ſo liable to break the furrow, which ſhould be carefully avoided; otherwiſe the graſs will be harrowed up and become prejudicial to the crop. Thus, as different ſoils will certainly require a different form of the breaſt, I ſhall not pretend to recommend either of theſe for general uſe: what I propoſe, is to give the wheelwright a certain rule to work by, which will hold good with every variation that may be required, either on account of the ſoil or fancy of the farmer. This laſt mechanical operation may be varied in any manner he pleaſes. For example, if the form of the breaſt, fig. 8, is too ſteep, by extending the two centers E F to 17 inches diſtance on the tranſverſe diameter to I and K, letting the perpendicular C D remain 16 inches, which will be the pitch of the throat; the ſtring fixed round the triangle I C K as explained before, will deſcribe the elliptical figure A C B, of which the fourth part A L C is the form required; and in this manner it may be varied by a certain rule, which not only facilitates work, but produces an inſtrument, which from its regular form cannot cauſe any obſtruction in the free paſſage of the mould, which every plough I have yet ſeen does, in ſome part or other of the breaſt or mould-board.

Theſe different ſweeps regard only the land ſide of the plough: as to the form and ſweep of the mould-board, I confeſs I have but very lately been able to determine it by any rule that can be laid down to a workman. My method has been, to attend to the falling of the earth when turned over by the breaſt, and to form the board to that curve, that it may eaſily ſlide over it without preſſure; but, as I think I have now diſcovered a practical rule, by which a plan of any form may be laid down on paper, I ſhall hereafter explain it, with drawings of different ſections of the mould-board, which I recommend for general uſe.

The bottom of the breaſt, where the buck of the ſhare joins to the board, I make as broad as can be admitted of. This of courſe is very flat, which I think aſſiſts in raiſing the furrow, being continued in a gradual ſweep to the heel of the board, which is not above half an inch wider than the fin of my ſhare. I muſt here obſerve, that the bottom of my mould-board is an inch and an half from the bottom of the furrow; and as the upper part of the heel of the mould-board hangs over ſome inches, if the line of inclination was continued to the bottom of the furrow, it would not be wider than the fin of the ſhare. In every other reſpect, my plough reſembles the *Rotheram*, except indeed in the fin of the ſhare, mine being much broader: the breadth of the fin of my plough, which is the ſize of the *Rotheram*, is full nine inches wide, and ſo in proportion to the ſize of the plough. This is contrary to the general practice; but I am convinced it is right, and ſpeak from experience.

My reaſon for trying the broad ſhare was, that as the coheſion of the earth creates a much greater reſiſtance than its weight does to the plough, I thought it fit to cut the whole furrow I wiſhed to raiſe; whereas the narrow fin cuts only a part, and leaves the remainder to be torn up by the wreſt of the plough. Some ploughmen think this laſt circumſtance neceſſary in lay-land, and ſay, if the ſhare cuts the whole furrow, it will ſlip away and be ſet on edge; which is certainly the fact, when the mould-board and body of the plough is badly conſtructed; but when the proper ſweep of the board is obſerved, and care taken that the heel of the plough is not too wide, I aſſert that the furrow will be turned over as flat as it is by thoſe ploughs that only cut a part of the furrow; which laſt circumſtance is a confeſſed fault, as a part of every furrow, ſuppoſe a fifth over the whole field, is left undiſturbed and is ſtill of greater conſequence in lay ground, which has acquired a degree of coheſion in proportion to the time it has been laid down to graſs. The objection of others, is, that in ſtiff land the broad fin will ſuck into the ground; or that the plough will ride upon the fin, and be thrown out of her work. I have proved the contrary to the conviction of my ſervants. But indeed I am very careful the fin does not hang down below the point of the ſhare. My rule is, that the point of the ſhare, point of the fin, and heel of the land-ſide, ſhall all touch a level ſurface when the plough ſtands upright; forming an arc from the point of the ſhare to the heel at the bottom, and the ſame on the land-ſide. See Plate XVII. Fig. 5. I do this becauſe the point and heel always wear the ſooneſt, and conſequently, without being hollowed, would ſoon become convex; after which the plough could not go ſteadily. For the ſame reaſon I am likewiſe careful to have the ſhort ſide of the buck of the ſhare clear the ground by an inch; for if that ever touches the ground, it immediately throws the plough out.

For the like reaſon I alſo make the land-ſide concave: and indeed by this form of the land-ſide and bottom, I can ſuppoſe the friction is ſomewhat diminiſhed; for though friction will always be in proportion to the weight and velocity, whatever ſpace the ſurface occupies, each part in contact bearing its ſhare, and therefore as much when touching only in two points, as when touching on the whole; yet I imagine this can only hold good when the plane, on which the body is moved, is ſmooth and hard; but in the caſe of a plough moving through a body of earth, the ſtickage or adheſion of the earth to the plough, will be in proportion to the nature of the ſoil, and condition it is in as to being wet or dry, and therefore the friction be more or leſs, in proportion to the number of points in contact. There is alſo this additional reaſon, that the point of the ſhare ought to tend a little into the land, becauſe the draught of the horſes is applied obliquely; eſpecially when all the horſes go in the furrow: and even when they go abreaſt, I have always found it neceſſary. In the laſt caſe, the neceſſity of it appears to me to ariſe from the plough's not having ſo firm a reſiſtance on the furrow ſide, which renders it liable to be thrown out of its work by the ſudden jerk of a horſe; and this would likewiſe be the caſe if the point of the ſhare did not tend a little downward into the ground. In my opinion, the not obſerving this rule is a fault in all the *Rotheram* ploughs I have ſeen; and the ploughman is obliged to rectify it by ſetting the coulter very much into land: but I think it is beſt, that the coulter ſhould only juſt clear the land-ſide of the ſhare; and I know by experience, when ploughs are made well, that is the only poſition they will work in. But it is impoſſible to lay down one general rule for the ſetting a coulter, either as to the vertical or horizontal angle: that muſt be left to the ploughman. For example, if the point of the ſhare is not well hardened, it will in one day's work wear out of land, or out of depth: in the firſt caſe, the coulter muſt be ſet into land to keep the plough in the ſtraight direction, as the tendency into land muſt counteract the oblique draft of the horſes: if the point of the ſhare has not depth enough, the coulter ſhould be ſet backward and not too cloſe to the ſhare, that the ſhare may have more freedom to enter the ground if on the contrary, it has too much depth, the coulter ſhould be ſet forward, ſometimes even before the point of the ſhare, and very low in this inſtance the reſiſtance of the earth againſt the coulter being before the point of the ſhare, it prevents its pitching too deep: this ſhould likewiſe be done when working in clay, for then the point will always ſuck into the ground; but when a plough is perfectly well made, and working in ground of moderate ſtiffneſs, the coulter ſhould be a little above the point of the ſhare, and juſt clear the land-ſide.

The ſwing-plough, when well conſtructed, is a very good inſtrument: but as it is liable to be thrown out of its work by a ſlip of the ploughman's foot, which throws the greateſt part of his weight upon the handles; or by a jerk of the horſes, which will elevate the point of the ſhare; it is an aukward tool to introduce into countries where the men are not uſed to it. Therefore, where the land is dry enough to be worked flat, which will admit of the wheel-plough, I greatly prefer it; particularly when neceſſary to plough deep. And I am of opinion that the draught is at leaſt as light, provided the proportion of the ſizes are nearly equal.

I make the form of the body of the wheel-plough exactly the ſame as that of the ſwing-plough; the only difference I make, is, that I ſet the point of the ſhare more down, becauſe now the beam becomes the moſt eſſential lever, which having a much ſteadier ſupport on the frame of the wheels, than it could poſſibly have when hung to the traces of the horſe; the additional tendency of the plough into the ground, cauſed by the dipping of the ſhare, having the ſteady and uniform ſupport of the beam on the carriage, enables it to overcome the various obſtructions in the ground, without the riſk of pitching in too deep, or of being thrown out of its work, which the ſwing plough is ſo liable to, when the different powers of the horſes and men loſe their equilibrium.

In this plough, the handles become a lever of the ſecond kind, chiefly uſeful to lift the plough out of the ground at the ends of the lands; and in this inſtance the handle and beam become one compound lever, the fulcrum being where the beam reſts on the carriage. If the point of the ſhare be not ſet deep enough, ſo as to tend ſufficiently into the ground, the bottom of the plough will not go on parallel to the bottom of the furrow, but will (as the farmer expreſſes it) run upon her noſe. In this caſe the ploughman is obliged to throw his whole weight upon the handles, and yet this is often ineffectual; but when the point of the ſhare has a ſufficient tendency into the ground, the plough will go a conſiderable length without holding. Here it is to be obſerved, as in the foregoing inſtance, that the uſe of the handles in the wheel plough is directly contrary to what it is in the ſwing plough; for in the laſt you raiſe the handles to give the point of the ſhare more endency into the ground, and preſs upon them to prize the ſhare out of the ground, which ſhews the neceſſity of giving more depth to the point of the ſhare of the wheel-plough; for, as in the ſwing-plough, by raiſing the handles, the inclination of the ſhare will have a greater tendency into the ground, and that in the wheel-plough, as the beam is ſupported by the carriage, the point of the ſhare is kept uniformly to the pitch it is ſet at, it is evident that care muſt be taken to give it ſufficient depth; if too much depth is given, that is to be remedied by raiſing the beam, as will be fully explained in its proper place. This evidently points out the utility of the carriage; and the ſteady going may be accounted for, Plate XVII. Fig. 9. by the tendency of the plough into the ground in the direction A C, being balanced by the reſiſtance of the carriage againſt the beam (which is in the direction A B) to that tendency; and theſe being equal, and in different directions, it is plain that the progreſſive motion of the plough muſt be in the direction A D. But to explain this eſtabliſhed fact by a familiar, though trifling inſtance, I ſhall compare it to the childrens play of ſhooting cherry ſtones, by preſſing them between their finger and thumb; when thoſe preſſures are equal, being in different directions, they will ſhoot them very ſtraight, otherwiſe they fly off obliquely: this muſt be the ſame with the plough; for though the progreſſive motion of the plough is occaſioned by the draft of the horſes, yet the reſiſtance of the earth on the ſhare, and that of the frame againſt the beam being in different directions and equal, the progreſſive motion muſt be in a ſtraight line between thoſe two powers of reſiſtance.

Many people object to the wheel-plough, as being heavier than the ſwing-plough: but when we conſider, that notwithſtanding the additional weight of the carriage, for which you muſt likewiſe add a little more than a third part for friction, in ſuch a rough machine as this, the whole being carried on wheels, the friction will be leſſened in the ratio of the ſquare of the diameter of the wheel, to the diameter of the axle. The weight of the earth upon the plough being in a great meaſure ſupported by the carriage, reaſon plainly tells us, that the wheel plough will be more eaſily drawn than the ſwing-plough, and experience has confirmed that it will. There appears alſo to be an additional advantage to the horſe, which is, that the line of direction of the draught is not from his ſhoulders to the point of the ſhare, but through (or rather even with) the center of the wheel; which of courſe is not in ſo oblique a direction, and conſequently the advantage to the horſe will be in proportion to the length of the lever, or radius of the wheel. I do not mean, that the power of the lever has any influence or advantage in drawing the body of the plough; for that cannot be, becauſe neither B nor F in fig. 10, plate XVII. have any greater progreſſive velocity than the plough itſelf has; but only that its length is an advantage to the horſe, by making him draw more parallel to the ground line, and makes a big wheel eaſier to draw than a ſmall one; that the friction in the wheel will be in proportion to the radius, and that the great wheel will ſurmount obſtacles with more eaſe than the little one.

The carriage of the *Norfolk* plough ſeems preferable to all others on account of its high wheels, the advantage of which I ſhall endeavour to explain by fig. 10, plate XVII.

Let A be the point where the power is applied, that draws the wheel H C along the plane D C G, and B the center of the wheel; then D B A is the line of traction, which makes the angle of traction A D G. Now if we conſider B C as a lever, whoſe fulcrum, or centre of motion, is at C, the line of traction being obliquely applied to this lever at B, the drawing power will be of no greater advantage, than if the line of traction were applied at E to the ſhorter lever E C, to which it is perpendicular: but if the ſize of the wheel be increaſed from H C to that of I C, and the power continues to act or pull at A, then F will be the center of the wheel, and F A the line of traction, which being perpendicular to the lever F C, the power will act with the greateſt force or advantage on that lever, for drawing the wheel along the plane D C G, both on account of the greater length of lever, and pulling at right angles to it. And thus the effective power of the horſe will be as much greater on the wheel I C, than on the wheel H C, as the radius F C is longer than E C. So that the higher the wheels are, the more eaſily they will be drawn, provided their axes are equal, and below the level of the horſe's ſhoulder, when ſunk down by exerting himſelf at the pull.

Though this eſtabliſhed fact may be ſufficiently explained and underſtood by many, yet by others it may be deemed a mere *ipſe dixit*. And as the conſtruction of all wheel carriages and rollers depends on the following propoſition, which, to the beſt of my recollection, has never been taken notice of in any book that treats on inſtruments of huſbandry, I hope it will not appear improper, if I inſert it here, with an attempt to demonſtrate it by a very familiar experiment on the ſteelyards.

Firſt, I ſay, in a wheel moved along any plane, a lever is to be found, whoſe fulcrum or center of motion is that point in the periphery of the wheel, which is in immediate contact with the plane; and if the line of direction of the draught to the other end of the lever, which is the center of the wheel, is not horizontal with the plane, it will form an angle of traction, as in the preſent caſe, A D G, and the power applied in the line D B A, to the long lever C B, to which it is oblique, will be required to be as great as if it was applied to the ſhort lever E C, to which it is perpendicular; in like manner, if the power was applied in the horizontal line B K, the power required would be as much leſs, than if applied in the oblique direction D B A, as E C is ſhorter than C B; for in this caſe the power drawing at right angles, will be to the power drawing obliquely, as the ſine comp. of the angle of traction is to the radius; and E C being perpendicular to B D, the hypothenuſe of the right angled triangle D C B, the triangle B C E muſt be ſimilar to B D C, which is ſimilar to A D G, becauſe B C is parallel to A G.

This I ſhall attempt to demonſtrate by the ſteelyard, that is, why the acting diſtance of a power muſt be at right angles with the end of the lever, and that whatever length the lever is of, if the power is applied in an oblique line, it will only act as a tangent to a circle, of which the radius is at right angles with ſuch line; but as in the ſteelyards made for the uſe of families, the center of motion is below the points of ſuſpenſion, and conſequently will not remain long enough in equilibrio to ſhew the experiment, I made one to explain this fact to my wheeler, which has the center of motion immediately above the line, in which the points of ſuſpenſion are. If the three points were exactly in a line, equally proportionable weights would ſuſpend each other in any poſition of the beam.

I mention theſe circumſtances as a hint to any one, who may chuſe to try the experiment.

Fig. 11, plate XVII. is the ſteelyard I conſtructed, having the beam A B 20 inches long, with the center of motion C, 4 inches from the point A, and 16 inches from B. At the point A ſuſpend a weight W of 4 ounces, and at the point B, on the long arm C B, being four times as long as C A, hang the weight P, of one ounce, which will counterpoiſe the weight W, the beam will be horizontal, and the weight hang perpendicular to the beam. If you extend the beam four inches longer to D, and hang the weight P at D, it will overbalance the weight W; but if to the center C you fix the oblique arm C E, equal to C D, with the point E perpendicular to B, and hang the weight P at E; it will hang obliquely to the long arm C E, and have no more effect on the weight W, than if it hung on at B, the end of the ſhort lever C B, to which it will hang perpendicular. In like manner, if you hang the weight P at D, and bring the ſtring over a pin at E, it will hang obliquely to both the long arms C D and C E, and have no more effect on the weight W, than if it hung on at B, to which it is perpendicular. Further, if you hang the weight P at B, and place the ſtring over the pully F, the weight P, which ſuſpended W in equilibrio, when hanging perpendicular at B, will now, in the firſt inſtance, be no more effectual, than if pulling at G the end of the ſhort lever C G, to which the line F B G is perpendicular, which will be as if the weight P was hung on the horizontal beam at H, as proved by the above propoſition: but the weight P hanging at H, not being ſufficient to ſuſpend the weight W, the beam A C B will become a C b, to which the line of direction of the power F b will be perpendicular. In this caſe, the exact proportions of the weight will be preſerved, the weight W will hang obliquely to C a, perpendicular to K, as P will hang obliquely to C b, perpendicular to I, when C K will be to C I, as C A is to C B. It is evident, to try this experiment, that the ſhort arm A C muſt be made to counterpoiſe the reſt of the ſteelyard, when no weights are hung to either.

This experiment plainly ſhews, that in fig. 10, plate XVII. the power applied to the center of the wheel H, in the direction B K, will be as much more effectual, than when applied in the oblique direction A B, as E O is ſhorter than B G, and therefore the power applied in the oblique direction A B D, to B C at the point B, of no more effect than if applied to the ſhort lever E C, at the point E, to which it is perpendicular; conſequently, as the power is by ſuppoſition at A, and the line of traction A F is parallel to the plane D C G, and at right angles with E C, perpendicular to the plane, it is the moſt advantageous line of direction of the power, both on account of the application of the power, and that the friction of the weight of the wheel and carriage will be diminiſhed, in proportion as the diameter of the wheel is to the diameter of the axis, with this additional advantage in favour of the great wheel, that it will go over clods and ſtones, with much more eaſe than the ſmall wheel, and not ſink into cavities, which would bury the ſmall wheel. However, what has been proved above, is only ſtrictly applicable to weights over pullies; for, as the power of the horſe does not ſolely conſiſt in his weight, but in the exertion of his muſcles, it will be neceſſary, that the line of traction ſhould incline a little from his ſhoulder to the ground. that he may have a firmer reſiſtance of the ground, to enable him to exert his muſcular ſtrength,

This long digreſſion from the deſcription of the plough, which only was at firſt intended, may be criticiſed; but as a doctrine in favour of low wheels has lately found its way into the world and as, in conſequence of it, I have heard myſelf condemned by ſome for the height of my wheels, and have been applied to by others for my opinion on the ſubject, I thought it might not be improper to introduce it in this place, for the conſideration of my brother farmers: indeed, the only apology I can make is, that I never found that this ſubject was ever touched on, even in the ſlighteſt manner, in any book that is likely to fall into their hands; otherwiſe it muſt betray more than ſtupidity, to offer to advance an explanation of a fact, that ſtands ſelf-evident in the mind of every one the leaſt converſant in mechanics.

The beam of the wheel-plough ſeems to be as little underſtood as that of the ſwing-plough. The reaſon of its being raiſed ſo high in the *Norfolk* plough, may be accounted for by the heigh of the wheels: but as I have ſeen the ſame pitch of the beam applied to low wheels, I ſhall endeavour to point out wherein I think this laſt method erroneous. Firſt, I lay down as fact, that the end of the beam, which reſts on the bolſter of the carriage, muſt be affected by the wheels, when they are put out of their perpendicular poſition by clods of earth.

Now, as the center of motion of the carriage is in a perpendicular from the end of the beam, between the wheels: the higher the end of the beam is above the wheels, the larger the arc will be, which the end of the beam deſcribes by the wheels being put out of their perpendicular poſition; and conſequently the body of the plough will be proportionably affected; that is, the arc, deſcribed by the point of the ſhare on the horizontal plane, will be to the ar deſcribed by the end of the beam, as the length of the bottom of the plough from point to heel, is to the length from the end of the beam to the heel, which is the common fulcrum. As to the alteration on the vertical plane, it muſt be equal, whether the beam is pitched high or low, only that the aſcent and deſcent of the point of the ſhare will be more gradual with high wheels, than low wheels. Some think, that by pitching the beam ſo high, the plough will go cloſer at heel; but the carriage acting, as a fixed perpendicular prop, will ſupport the beam equally ſteady at any height; and if you deſcribe a vertical arc, by the end of the beam, the nearer it comes to a horizontal poſition, the further that part, which reſted on the bolſter, will go beyond the perpendicular from the point whereon it reſted; conſequently, if the frame be carried forward to that point of the beam, the power will be applied nearer at right angles at that point in the lever, and in ſuch proportion a leſs degree of power will be ſufficient to counteract the reſiſtance; or in other words, a leſs weight will be on the wheels. And therefore if the firſt application of the carriage was ſufficient, a ſhorter beam will do, when pitched nearer to a horizontal poſition, with the additional advantage of the plough being ſtronger, as the frame work is more compact. To elucidate this more fully, I ſhall endeavour to explain it by fig. 12, plate XVII. A B is the high pitched beam, C the center of the wheel, whoſe perpendicular frame ſupports the beam at B; but as the beam or lever A B is oblique to the prop C B, it acts with no greater power in ſupporting the weight, than the ſhorter beam A F, which is nearer at right angles with C F: but if the beam A D is deſcribed equal to A B and the center of the wheel of the carriage, which ſupports the beam at D, the prop E D will be nearer at right angles with the beam A D, which is equal to A B, and in that proportion the greater advantage of the lever is obtained. Thus it is evident, that in the beam A D the preſſure is leſs on the center E, than it would be in the beam A B on the center C; conſequently, if the weight is not too great at C, a ſhorter beam is ſufficient in the direction A F.

I have endeavoured to aſcertain the angle which the beam ought to make with the horizontal plane, as likewiſe the angle which the point of the ſhare ought to make with the ſame plane; but as the diverſity of ſoil, and the different condition the ſame ſoil will be in from wetneſs renders it impoſſible to fix certain data, I found it impracticable; the only obſervation I have been able to make is, that when the end of the beam, that reſts on the bolſter, has been within ten inches of the axle of the wheels, if the point of the ſhare tended ſufficiently into the ground, the plough has gone as cloſe at heel, as when the beam was mounted higher, and infinitely ſteadier, for the reaſons before mentioned; therefore this muſt be determined by the height of the wheels, and by the different depths you wiſh to plough; if ſhallow, reaſon points out, that the beam need not be pitched ſo high; but if deep, allowance muſt be made for lowering the beam on the carriage. The beam of my plough, which I frequently work 18 inches deep, makes an angle of 18 degrees with the horizon: as to the dipping of the ſhare, I fear that muſt depend on the nature of the ſoil and judgement of the ploughman. If the plough does not go cloſe at heel, and that this imperfection in the going of the plough is not occaſioned by the width of the heel of the mould-board, which in that caſe will ride on the furrow, eſpecially in ſtrong land, you may depend on it, that the point of the ſhare is not ſet deep enough. Very little alteration will ſometimes produce the deſired effect; therefore it ſhould be done with caution; for if ſet too low, the beam muſt be raiſed on the bolſter of the carriage till the diagonal of the parallelogram compleated from the tendency of the ſhare, and poſition of the beam, becomes parallel to the horizon.

The only part of the wheel-plough, which now remains to be conſidered, is the chain, which faſtens the plough to the carriage. In regard to the poſition of it, different countries have their different practice; they all indeed agree in this, that the end, which is made faſt to the carriage, ſhould be hooked on a little below the axle of the wheel; but the application of the other end of the chain, differs according to the cuſtom of the country; in ſome places they fix it round the near handle, immediately above or below the heel of the beam; others fix it over the beam, behind the head of the ſheath; and in ſome parts of *France* they uſe no chain, only have a wooden collar, which goes over the fore end of the beam, where it is confined by a wooden pin, which goes through the beam, and under the end of a piece of wood, which goes through the axle-tree of the wheels, to which it is likewiſe confined by a wooden pin. Now theſe three methods are as oppoſite as poſſible; yet when the plough is well conſtructed, I never could diſcover any difference ariſing from the different application of the draught ; the firſt indeed evidently ſeems beſt calculated for the ſtrength of the plough, as the chain goes round the whole body of it ; but in this caſe, the chains are generally laſhed up to the beam before the coulter. There are two reaſons for this ; the one is, that in ploughing deep, the chain hanging ſo low, would prevent the mould from riſing ; the other is that, if the heel of the beam is pitched low, the chain will incline upwards to the carriage ; whereas, I believe, it is proper that the chain ſhould have this different direction, as it will draw the plough into the ground, which tendency, as I have explained before, will always have ſufficient and ſteady reſiſtance in the carriage, againſt the beam. The *French* method is certainly bad, nor could it produce the deſired effect, was it not that their beam is exceſſive ſtout, not admitting of any elaſticity. Cheapneſs is undoubtedly their motive ; but it could not poſſibly anſwer in ſtrong work : for my own part, I prefer the placing the chain over the beam behind the ſheath : but I uſe this precaution in my large ploughs ; I have a long link which goes from the end of the chain on the beam round the heel of the plough, immediately below the heel of the beam ; this confines the whole body of the plough together, though the draught in fact is from the top of the beam.

As what I have ſaid above is in part to prove, that the poſition of the beam cannot affect the plough, in regard to its going cloſe at heel, I ſhall juſt mention what I have proved to many, which is, that unleſs a plough is narrow behind, it cannot go cloſe at heel, but will ride on the furrow ; and that unleſs the point of the ſhare has a ſufficient tendency into the ground, the plough cannot go level at bottom.

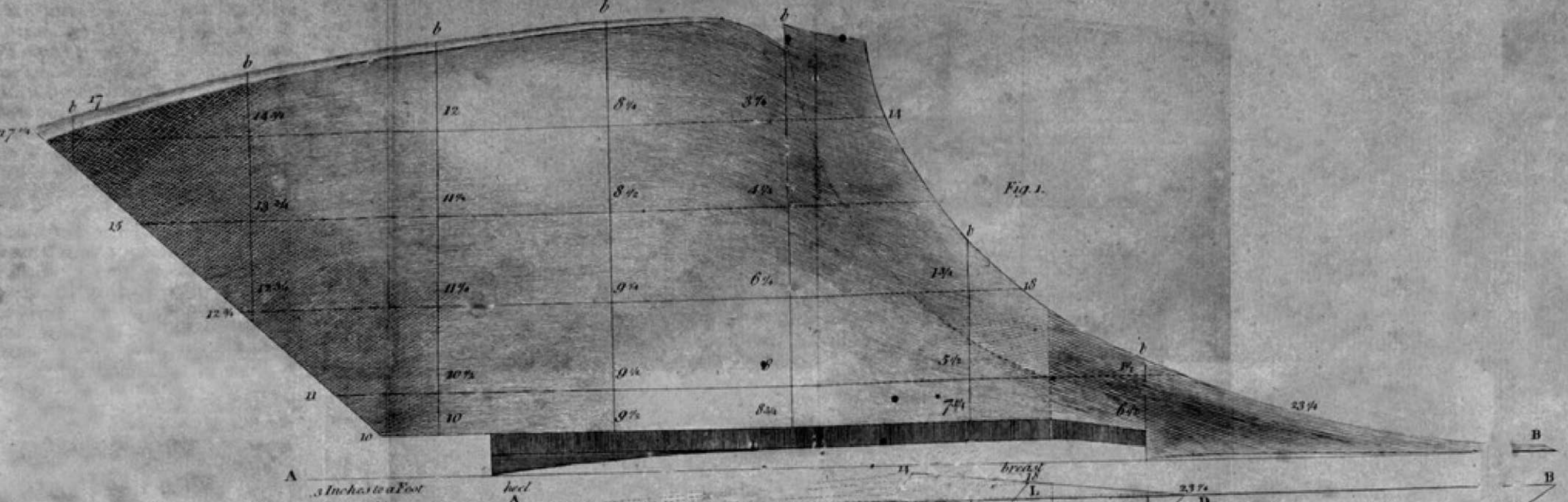
I have already declared (what I believe will be allowed) that different ſoils and different operations, require different ploughs: but as there are many farmers who cannot afford to have variety of ploughs, I ſhall venture to recommend one for general uſe, which ſeems to anſwer the ſeveral purpoſes much better than any I have yet conſtructed. The conſtituent parts are put together in the manner of the *Rotheram* plough. See plate XVIII. fig 2. The ſhape of the breaſt, from the point of the ſhare to the throat, is the arc of half a ſemi-ellipſis, whoſe ſemi-conjugate diameter is 16 inches, and the focus's at 17 inches diſtance from the common center. See plate XVII. Fig. 8. the outward ſweep of which, A L C, is the above-mentioned form. As to the form of the mould-board, I ſhall not dogmatically pronounce it the beſt that is; but as it is the beſt I have yet made, I ſhall venture to give the deſcription of it, obſerving, that as I made it by the eye, and completed it in the field by attending to the aſcent and delivery of the furrow, I took the dimenſions of all the different curves, and laid them down on paper. I ſhall deſcribe the method by which I did it, not without hopes of its leading to a diſcovery of ſome eaſy practical rule for the uſe of workmen, who have at preſent no other guide but their eye, to form the ſweep of a curved board, which is tedious, and conſequently very expenſive; and therefore I ſuppoſe the reaſon that the ſtraight board is ſo much in uſe, having no other recommendation than cheapneſs.

Plate XVIII. repreſents the frame work, and dimenſions of the different parts of the plough without the mould-board. A B is the beam, 6 feet long, having the under part of the two ends 14 inches from the ground line: C is the ſheath, 7 inches wide, where it is mortiſed into the beam; it is 3 inches thick, and bevilled off in the breaſt, from the land ſide, to anſwer the curve of the mould-board: the front of the ſheath at C is 18 inches from A, and 16 inches perpendicular from the ground line. D is the near handle, into which the end of the beam is mortiſed at A; it ſhuts cloſe at bottom to the hind part of the ſheath, and is faſtened to it by the wooden pin E, and ſpikes at the bottom. F is a triangular piece of wood which ſhuts on the lower part of the handle D, and is faſtened to it by the pin G, and ſpikes at bottom; this triangular piece makes the heel of the plough. H is the ſhare, 18 inches long, from the point to the top of the buck P, having the fin Q 14 inches long, and 9 inches wide. This width is right in free land; but in ſtony land it will require a point at the end, nor muſt the fin be wide: indeed ſome lands are ſo ſtony as not to admit of any fin: it goes on upon the end of the ſheath, as in common ploughs it does on the chip; the land-ſide is continued the whole length, and drops at the heel about ¾ of an inch below the triangular piece; this forms the arc at bottom, from the point of the ſhare to the heel: it is faſtened on by a ſcrew-bolt, which goes through the triangular piece at I. The heel of the plough reſts ſolely on the heel of the iron plate, without ſuffering the wood to touch the ground; which, for the reaſon given in page 540, muſt diminiſh the friction; but this indeed is more effectually accompliſhed by Mr. *Moore*'s very ingenious thought, of placing the vertical wheel in the body of the plough, which ſerves as the heel of the plough: but in ſtriking up the laſt furrow of the land, I have experienced the advantage of the iron heel, as by its cutting into the ground it prevents the plough ſlipping away from her work. K is the coulter, fixed in

the beam with wedges inches before the ſheath L is the off handle, to which the hind part of the mould-board is faſtened by the large wooden pin M, which goes through the mould-board, handle, and triangular piece at the heel: the ends of both handles ſtand level when the plough is upright, to render it difficult for the ploughmen to hold the plough over on the land-ſide. The ends at N are 2 feet 9 inches from the ground, and 4 feet 2 inches from the end of the beam at A: the perpendicular from A is 6 inches behind the heel of the plough: from the heel to the point is 3 feet: from the point of the ſhare to the bottom of the end of the beam at B, is 2 feet 9 inches. O is the *Suffolk* copſe with the cat-head, as deſcribed in plate XVII. fig. 1 and 2. R and S are too wooden pins which faſten the breaſt of the mould-board to the ſheath. T U two wooden pins that faſten the tenon of the ſheath into the beam. The framing of this plough, which is the ſame as the *Rotheram*, appears much ſtronger than the common one, and admirably well contrived to prize the weight of earth on the ſhare, without a poſſibility of racking the tenons of the ſheath and beam; for you will obſerve that the handle which reſts on the triangular piece at the heel, prizes up the lower end of the ſheath on which the weight of earth is; forcing it up to the beam, and thus, by lifting the beam, prevents the tenon, which is mortiſed into the handle, from being ſtrained; whereas, in the common plough they are always pulling aſunder, requiring a falſe coulter and tuck to keep the beam and chip together; and as this plough requires none, it ſhews how much ſtronger the conſtruction is.

Plate XIX. repreſents the compleat body of the plough; the horizontal lines on the mould-board, marked *a a a a a*, are ſquare, with parallel

lines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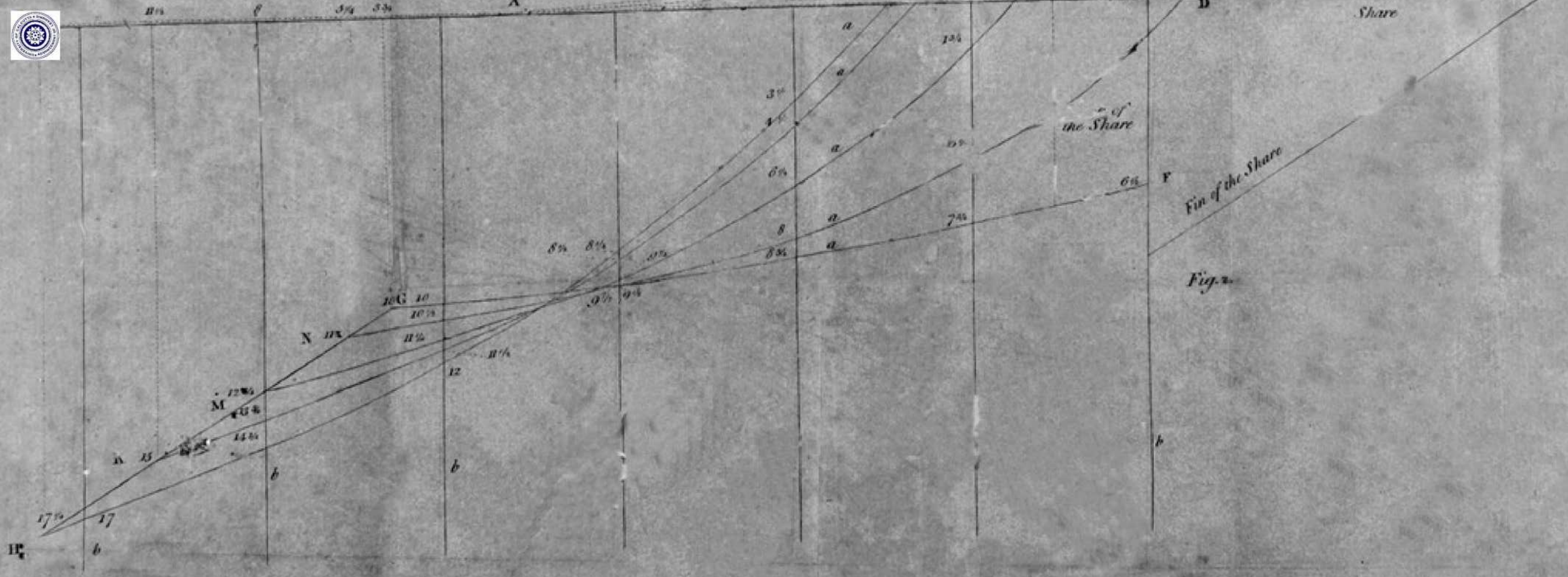
Share

Fig. 1.


11⅝
6
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3⅝
a
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10
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N
11⅞
11⅝
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12
M
12⅝
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R
15
17¾
17
b
b
b
b
H
b

Fig. 2.

ies on the land ſide of the plough, which are 3 inches aſunder, except the under one, hich is only 1 ½ inch, from the ſecond being ½ inch clear of the bottom of the furrow: as, n this, I differ with many, ſhall give my reaſon, which is, that when the plough is working in land that cuts the whole furrow; if the bottom of the board or ground-wreſt, touches the furrow that is turned over, it muſt preſs it in at bottom, which will naturally make it fall back again at top, or at leaſt ſet it on edge; and, if in looſe mould, by ſqueezing in the bottom, the upper mould muſt fall back into the furrow, having no baſe to ſupport it: my rule is, that the heel of the board ſhall juſt ſlide againſt the furrow, without diſplacing it from the form it ll in.

The perpendicular lines *bbbbbbb* are ſquare, ith parallel lines on the land-ſide, which are 6 ches aſunder where the lines interſect; I took e dimenſions of the thickneſs with callipers, marked on the boards which correſpond with ne marks in Plate XIX. fig. 2. which repreſents e perpendicular, or bird's-eye view of the mould-board: the curved lines *aaaaa* in this figure, correſpond with the horizontal lines; and the perpendicular lines *bbbbbbb* with the perpendiculars: where theſe lines interſect, the figures ſhew the diſtance from the line A P which is ſuppoſed to be the land-ſide of the plough: theſe correſpond with the dimenſions taken by the callipers, as marked on the upright board; they are [illegible] drawn to one ſcale, of 3 inches to the foot. As it is neceſſary that the breaſt of the plough ſhould hang over a little to the land-ſide, I was obliged to raiſe a perpendicular board, ſquare with a line drawn from the point to the heel: by this means I was enabled to fix the callipers, taking off the difference of the thickneſs of the board from each meaſureme

I have been the more prolix in the deſcription
theſe figures, being unwilling to omit any circu
ſtance which might explain them, as, at leaſt, it
a certain and eaſy method for a wheelwright to tal
the exact dimenſions of any plough he is ordered
copy, and by making moulds from the curve
lines in Plate XIX. fig. 2. and applying ther
(according to the following directions) to th
mould-board, when hewed out to near the ſhape
he will eaſily bring it to the required form.

Let A B be a line drawn from the heel of th
plough to the point of the ſhare; extend the lir
from A, 15 inches to C: and at D, 23 ¼ inche
diſtance from A, raiſe the line D E, whic
repreſents the hanging over of the breaſt of th
mould-board on the land-ſide; making an ang
of about 83 degrees with the plane of the hor
zon. Then place the mould of the lowermo
curved-line, to the angle of the buck and fin
the ſhare at F; which is 6 ½ inches diſtanc
from the vertical plane of the line A B; and
inches diſtance from the ſame plane at G; e
tending 3 ¾ inches beyond the upright ſquare
the heel A. The end of the mould at G, mu
be 1 ½ inch from the g[illegible], but at F it w
be but about an inch and a quarter; riſing gr
dually to the end of the buck, as repreſented
Plate XIX. You muſt then apply the uppe
moſt mould at E, which is 12 inches perpend
cular from the ground, and 14 inches from th
perpendicular of the heel A. The mould-boar
muſt then be worked with the ſpo[illegible]ve,
the other end of the mould, when held quit
horizontal, will touch at H; which is likew
of courſe, 12 inches from the ground; and 17
inches from C, on the vertical plane of C A
extending 15 inches beyond the ſquare of th
heel A. Theſe two curves being fitted, cut c

ti

the heel of the mould-board in the line G H. You then proceed to fit the moulds I K, L M, and D N, dropping each curve 3 inches perpendicular; when the curve D N will be 3 inches from the ground, but only 1 ½ inch from F G: This was done to take the moſt curves, where the greateſt twiſt of the board is required.

With the above deſcription and drawing, my wheelwright has made exact copies of this plough, without having the original plough to work by. I therefore flatter myſelf it will be ſufficiently explanatory for the uſe of workmen.—My mould-board, indeed, riſes about two inches higher; but as theſe were the only curves requiſite for turning the furrow, I thought it needleſs to inſert more lines, which the workman may do at his pleaſure; having the ſweep of the breaſt E D, and the heel of the board G H, for his direction. There is likewiſe this farther advantage, that by varying the ſweep of the curved lines in Plate XIX. fig. 2. a workman may lay down any ſhape he thinks proper, and be certain his work will anſwer the drawing. As I mentioned that this plough performed the work much better than any I had made, I muſt remark one particular circumſtance; which is, that all the curved lines nearly interſect each other in the center of the board. This was merely accidental, having formed the board entirely by eye; but may ſerve as a hint, and probably will prove, that their meeting exactly in the center, is the proper form for turning the furrow. I have reaſon to believe this was ſo; having worked the board ſome time without plates, till I found it to my mind: probably it may have been worked a day or two too long, and by that means be hollowed out a little too much in the middle of the board.

I ſhall conclude, by obſerving that a plough may be made of any dimenſions, by the drawing of Plate XIX. fig. 2. If it is required to be ſmaller, *viz.* of 2 feet 6 inches at the bottom, and the reſt in proportion; the only alteration neceſſary to be obſerved is, to conſider the ſcale as of 3 ⅗ of an inch to the foot, inſtead of 3 inches: if, on the contrary, it is required to be larger, *viz.* 4 feet long, and the whole in that proportion, the ſcale muſt be then conſidered as being of 2 ¼ inches to the foot, inſtead of 3 inches

Ravenſbury,
Oct. 2, 1770.

On this very ſenſible and truly practical eſſay on the conſtruction of a plough, I ſhall only obſerve, that its utility muſt be apparent to the moſt ſuperficial obſerver. Of what conſequence is it to form one perfect plough, if you have no rules by which to execute another?

The following are the particulars of this gentleman's farm.

297	Acres in all.	12	Labourers
126	Graſs	3	Boys
171	Arable	37	Acres wheat
£.200	Rent	18	Oats
13	Horſes	17	Beans
6	Cows	80	Madder
300	Sheep	10	Turnips
4	Young cattle	5	Cabbages
40	Swine	13	Fallow.
1	Man		

END of the SECOND VOLUME.